

**PERCEPTIONS AND EXPERIENCES OF INVESTIGATORS IN THE SAPS
REGARDING THE APPLICATION OF POLYGRAPH IN CRIMINAL INVESTIGATIONS**

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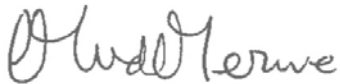
**PERCEPTIONS AND EXPERIENCES OF INVESTIGATORS IN THE SAPS
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INVESTIGATIONS**

KEY TERMS:

Polygraph; Deception; Polygraph Examiner; Polygraph Examination; Polygraph Instrument; Validated Polygraph Techniques; Error Rate; Confession; Admission.

16 July 2020

I, Marlette van der Merwe, hereby certify that both the text and list of references of the master's dissertation titled "Perceptions and experiences of investigators in the SAPS regarding the application of polygraph in criminal investigations" by Manjula Gumala, have been edited by me, according to the referencing method (2019 edition) used by the School of Criminal Justice, Unisa.

A handwritten signature in black ink, appearing to read 'Marlette van der Merwe'. The signature is written in a cursive, flowing style.

Marlette van der Merwe

BA (English) HDipLib (UCT)

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ABSTRACT

In spite of the SAPS having a dedicated polygraph capacity since 1998, little research has been conducted with regard to the use of the polygraph in criminal investigations. Consequently, the aim of this research was to focus on the perceptions and experiences of investigators in the SAPS regarding the application of polygraph testing in criminal investigations, the application of the polygraph as an investigative aid, the extent to which it is used by SAPS investigators to resolve criminal cases opened by the general public and/or in internal departmental criminal investigations; and whether or not it has helped to solve cases by giving direction and/or focus to the investigator when an investigation is at an impasse.

A qualitative research approach was conducted among investigators within the SAPS. The research design selected for this study was grounded theory. The sample consisted of twenty investigators, ten of whom had previously used polygraph examinations in their investigations and ten of whom had not.

Data was collected from interviews, document analysis, field notes and memoranda which presented and detailed the perceptions and experiences of investigators in the SAPS regarding the application of polygraph tests in criminal investigations.

ABBREVIATIONS

APA	American Polygraph Association
CCMA	Commission for Conciliation, Mediation and Arbitration
CIT	Concealed Information Test
CQT	Comparison Question Test
DNA	Deoxyribonucleic Acid
DoDPI	Department of Defence Polygraph Institute
ESS	Empirical Scoring System
FBI	Federal Bureau of Investigation
IO	Investigating Officer
PDD	Psychophysiological Detection of Deception
SAFLII	Southern African Legal Information Institute
SAPS	South African Police Service
SPF	Singapore Police Force
US	United States

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Chapter 1

ORIENTATION AND BACKGROUND

1.1 INTRODUCTION

Crime is by no means unique or exclusive to any particular society. It is prevalent in all communities throughout the world, with many countries experiencing very high levels thereof (Eterno, 2012:4). Due to, among others, an escalating global population, crime rates have also amplified significantly. This trend has implications for policing, as it means that the caseloads for investigators are continually on the increase (Eterno, 2012:14).

In South Africa, a similar trend is evident. According to the South African Police Service (SAPS) Annual Performance Plan 2018/2019 (2018:41), during the 2016/2017 reporting period, of the 2 158 281 serious cases reported, a mere 781 830 cases were solved, indicating an alarming detection rate of 36.22%. The calculation of the detection rate was based on the total number of cases that were referred to court, which were added to charges that were withdrawn before court, as well as cases that were closed undetected, divided by the total number of cases that were investigated. For the citizens of South Africa, such a low detection rate is disconcerting, and cannot be deemed acceptable, considering the advances in technology and resources available to investigators. Given the vast number of investigative tools and resources available to investigators, the detection rate ought to be much higher.

Investigators in the SAPS have an array of diagnostic aids at their disposal, including the forensic science disciplines (SAPS, 2009:360-361). While all forensic science disciplines play a crucial role in crime investigation, none has attracted as much controversy, or is as misunderstood, as the polygraph.

In recent years, movies and television programmes have often featured the polygraph in their storylines, thus propelling its use further into the spotlight. Interestingly, in most of the television programmes, movies and/or serials viewers are usually left enthralled by characters manipulating the tests. Resultantly (and somewhat unfortunately), it has

perpetuated the belief that polygraph examinations are unreliable, easy to manipulate, and have no evidentiary value. The researcher therefore felt compelled to determine whether this is a fair application and image of the polygraph, as polygraph examinations are regularly used by the law enforcement community in South Africa as an investigative tool in criminal investigations.

1.2 PROBLEM STATEMENT AND RATIONALE OF THE STUDY

According to Pardede (2018: 195), the aim of quantitative research problems is to explain or predict the connections, relations or comparisons between variables, while qualitative research problems explore, describe and understand a phenomenon. It can therefore be stated that a problem statement describes the issue being researched comprehensively by providing the background and context of the problem to be investigated. Cooper and Schindler (2014:195) explicate that a research problem can be conceptualised as a hierarchy of questions emanating from a management problem. The authors indicate that it is usually a 'how and why' problem, which results in a descriptive or explanatory study (Cooper & Schindler, 2014:165). Once the research problem has been identified, a problem statement can be formulated.

A problem statement must explicitly identify the issues which the researcher elects to focus on (Bouma, Ling & Wilkinson 2012:32). It is explained by Brynard, Hanekom and Brynard (2014:18) that a problem statement guides and focuses the planning of the study and the actual research itself. It necessitates a specific description in as few words as possible, but which, in its brevity, should still communicate the maximum amount of information regarding the research topic. Those who read the problem statement should therefore be clear that solving the problem requires analytical thought.

Polygraph examinations are used nationally and internationally to eliminate suspects, exonerate innocent people who may be surrounded by circumstantial evidence, and to test the truthfulness of witnesses or complainants. Within the South African law enforcement community, SAPS investigators have been using the polygraph as an investigative aid in criminal investigations since 1998. The polygraph capacity within Forensic Services is directed at criminal-specific polygraph examinations. The

clientele for whom they provide polygraph examinations are investigating officers who investigate criminal cases opened by the general public, or in internal departmental criminal investigations (Hanekom, 2020:1). It is against this background of polygraph tests being advocated in the use of criminal investigations that this study sought to focus on the perceptions and experiences of investigators in the SAPS regarding the application of the polygraph in criminal investigations.

In a study, it is expected that a rationale and background are developed for the envisaged research. In the rationale and background, reasons are substantiated for undertaking the study. This is achieved by indicating why the study is worth conducting, as well as why the researcher is interested in the particular task. The role of the rationale is thus to illustrate the significance of the study (Regenesys Business School, 2014:35).

This research undertaking was motivated by the fact that there were considerable studies that have been conducted in the polygraph field, especially in the United States (US) by the Department of Defence Polygraph Institute (DoDPI) since 1986 (Matte, 1996:3). In South Africa however, there is a dearth of research initiatives from the polygraph fraternity. Over the years, polygraph examiners and researchers known within polygraph circles, such as Backster, Garland, Ben-Shakhar, Honts, Raskin, Horvath, Lykken, Matte, Nelson, and Gordon, among others, have contributed significantly to polygraph research. Annually, research documents and presentations are circulated by the American Polygraph Association (APA). The research presented is, however, almost exclusively based on the American experience.

Since 2001, in South Africa, there have, from time-to-time, been articles published by academics such as, for example, Tredoux and Pooley (2001), Cilliers and Martin (2002), Herbig (2010) and Herbig (2018). Overall, however, in South Africa, development, research and constructive critical debate have been minimal.

This study was therefore considered necessary, in order to fill the gap in polygraph research in the SAPS environment, as there is a dearth of research about whether or not polygraph examinations have proved to be effective and successful in the SAPS. This was particularly beneficial and worthwhile knowing, in view of fact that

considerable time, money and resources are invested in ensuring that polygraph examiners in the SAPS are kept abreast of the latest technology, training and international developments.

1.3 RESEARCH PURPOSE, AIMS AND OBJECTIVES

Research is a systematic process involving the collection, analysis and interpretation of information so as to increase the understanding of a particular subject that is of interest to a researcher (Edmonds & Kennedy, 2016:xvii). Researchers purposefully set out to augment their understanding of a phenomenon and are expected to communicate what is discovered to the broader scientific community (Leedy & Ormrod, 2013:2). Brynard et al (2014:3) concur that research is a process whereby an undertaking is made to attain answers to questions and to explain identified problems in a methodical manner with the support of verifiable facts.

The Heriot-Watt University School of Management and Languages (2015:6), delineates the aim of a research study as providing a narrative of what a researcher wants to accomplish by conducting the research. It is further asserted that the objectives of research outline the subject that is being addressed to achieve the aim/s. Consequently, the aim of this study was to explore and determine the perceptions and experiences of SAPS investigators regarding the polygraph as a diagnostic tool in criminal investigations in the South African context.

Objectives (which are more specific than aims) outline particular dimensions of the research topic which are relevant to the overall aim of the study. Research objectives help to break down the research problem into manageable (or researchable) parts that can then be explored separately. Each research objective addresses one facet of the research problem. This ensures that all facets of the research problem are, in effect, investigated. Research objectives which are clearly defined enable the identification of the most suitable research method/s for the investigation of the objectives (Regenesys Business School, 2014:33)

The objectives of this study were the following:

- To determine the findings of other researchers with regard to the perceptions and experiences of investigators regarding the application of polygraph examinations in criminal investigations;
- To ascertain empirically the extent to which SAPS investigators use polygraph examinations in criminal investigations to solve their cases, and whether polygraph examinations are a viable and beneficial diagnostic tool in South African criminal investigations; and
- To use grounded theory, which is a type of inductive crime and justice theory that is frequently used in qualitative research to build towards abstract theory by making comparisons of ground-level empirical observations.

1.4 RESEARCH QUESTIONS

Leavy (2017:92) describe research questions as the principal questions that are addressed in a study. The Heriot-Watt University School of Management and Languages (2015:6) contends that research questions are more specific than objectives, specifying the various insights and information that must be collected in order to achieve the objectives. Research questions take into consideration why the study is being conducted, the connection to the research paradigm, what is already known about the issues being studied as well as the tentative theories about the phenomena. The research questions must also be answerable by the kind of study the researcher intends to conduct. Furthermore, in order to develop appropriate research questions, the researcher must understand clearly what a research question is (Maxwell, 2013:76).

Creswell (2009:129) purports that in a qualitative study the researcher states research questions that take two forms, namely a main question and associated sub-questions. The main question is a broad question that requires an investigation of the central phenomenon (or concept) in the study. This question which is posed is consistent with the emerging methodology of qualitative research as a general issue, so as not to limit the investigation. Following the main question are several sub-questions that narrow the focus of the study. Maxwell (2013:79) reiterates that in qualitative research,

questions must be framed in terms specific to the setting or participants included in the study, for it to be advantageous. Appropriately framed questions help protect the study from inappropriate generalisation; it can assist the researcher recognise the diversity among participants or settings that are being studied, and it helps focus on specific beliefs, actions and events that can be observed.

The success of a research study hinges on the pertinent questions being asked. It must also be grounded in research that is clear and coherent, and which specifically probes what the researcher wants to know (Sullivan, Gibson & Riley, 2012:34).

In this study, the main research question was the following: "What are the perceptions and experiences of the SAPS investigators regarding the polygraph as a diagnostic tool in criminal investigations in the context of the South African law enforcement community?"

The sub-questions which can become specific questions used during interviews were as follows:

- 1.4.1 What is the status of the current theoretical basis of polygraph examinations internationally and in South Africa?
- 1.4.2 What is the current status of polygraph application in the South African Criminal Justice System?
- 1.4.3 Are polygraph examinations effectively used by SAPS investigators as an investigative tool in criminal investigations?
- 1.4.4 Is/has the polygraph been effective in solving criminal cases within the context of the SAPS?
- 1.4.5 What are the (potential) shortcomings that have been identified with regard to the application of the polygraph in criminal investigations within the SAPS context?

1.5 VALUE OF THE RESEARCH

Polygraph examinations, as portrayed in the media and by the general public, have perpetuated the image of the discipline as being unreliable. Although this is the common image depicted regarding the polygraph, it is not necessarily the correct

interpretation of the use of the polygraph. This study concentrated on exploring the use of polygraph examinations by SAPS investigators as an investigative aid in criminal investigations.

In recent years there have been huge strides in terms of research, development and ethics regarding the application of the polygraph (Matte, 1996:3). While polygraph examinations have been in use in South Africa since the late 1970s, there has been limited research and critical debate nationally regarding the role and potential value that polygraph can play in addressing the exceedingly high levels of crime in the country. It has therefore become crucial to consider available modern technology such as polygraph, and its advances, to adequately address the challenge of crime in South Africa. Consequently, when a polygraph examination is conducted by a well-trained and ethical polygraph examiner, it can be a valuable investigative tool that can enhance an investigation – especially when it has deadlocked, serve as a deterrent, and save on manpower, costs and resources, which can then be optimally channelled into other areas of crime prevention and investigation.

Previously, the extent to which the polygraph is used by investigators in the SAPS to resolve criminal cases, was not adequately researched. The reasons for the lack of research in this environment are that, in the SAPS, the primary function of polygraph examiners is to provide assistance, insight and direction in an investigation (Hanekom, 2020:1-2). There is no mandate or expectation for any SAPS polygraph examiner to conduct research or publish articles. Furthermore, within the SAPS there is no forum or platform available whereby polygraph examiners can discuss, share and/or relate experiences that can improve, enhance and contribute to polygraph research within the South African law enforcement community.

A study focusing on the perceptions and experiences of investigators in the SAPS, regarding the application of the polygraph as an investigative tool in criminal investigations, should significantly contribute to the field of polygraph testing in South Africa. It is also envisaged that it will benefit the SAPS, as the polygraph, being a useful investigative tool, can help solve more cases than is currently the norm, by giving direction and/or focus to the investigator, especially when an investigation is at an impasse. It is therefore envisioned that this study will undeniably enhance the

understanding of how the polygraph is used by SAPS investigators in South Africa, its utility and success, and also highlight possible stumbling blocks.

1.6 DEFINITIONS AND KEY CONCEPTS

1.6.1 Deception

According to Krapohl, Handler and Sturm (2012:24), deception is a deed of either purposefully providing or omitting information with the intent to mislead another person. Memon, Vrij and Bull (2003:7) define deception as “a successful or unsuccessful deliberate attempt, without forewarning, to create in another a belief which the communicator considers untrue”. De Paulo, Malone, Lindsay, Muhlenbruck, Charlton and Cooper (2003:74) concur by defining deception as a “deliberate attempt to mislead others”. Untruthful instances or occurrences that are communicated mistakenly are not considered to be deception as the act of lying is must be deliberate.

1.6.2 Forensic psychophysiological/ polygraph examiner/ polygraphist

The terms ‘polygraph examiner’ and ‘polygraphist’ were replaced by the term ‘forensic psychophysiological’ by the United States Department of Defence Polygraph Institute (Matte, 1996:4). The APA Standards of Practice (2018c:np) defines a forensic psychophysiological/polygraph examiner/polygraphist as an individual who meets the training and education requirements as set by the APA bylaws (2018a:np).

Within the context of South Africa, in Chapter 1, sections 1-2 of the Intelligence Services Act 65 of 2002 (Department of Justice, 2002), a polygraphist is defined as follows:

A person who, in order to ascertain, confirm or examine in a scientific manner the truthfulness or otherwise of statements made by another person, uses skills and techniques in conjunction with any equipment and instrument designed or adapted for that purpose.

For the purposes of this research, the term ‘polygraph examiner’ will be used.

1.6.3 Investigation of crime

Van Rooyen (2008:13) explains the investigation of crime as the systematic and organised search for the truth. It involves observation and enquiry for the purpose of gathering objective and subjective evidence about an alleged crime or incident.

According to Hess, Orthmann and LaDue (2016:8) and Orthmann and Hess (2013:8), the investigation of crime is the process through which an investigator gathers documents and evaluates the facts of a crime. The main tenets of the investigator's actions are to do the following:

- Establish that an offence was indeed committed;
- Identify and apprehend the suspect/s; and
- Help the prosecution team in prosecuting the suspect/s charged with the offence.

1.6.4 Investigator/ Investigating Officer

Van Rooyen (2008:13) defines an investigator as “a person who investigates reported crime by collecting information and evidence”. It is the responsibility of the investigator to seek the truth by gathering the facts that will solve the crime, and by taking cognisance of ethics as well as legal guidelines. In order to be successful, investigators must be able to work in collaboration with patrol members, forensic laboratory analysts, and also be able to communicate with people from all socioeconomic classes and professions (Palmiotto, 2012:4-6).

Within the SAPS, an investigator is commonly referred to as an investigating officer (IO). In this study, both terms are used interchangeably.

1.6.5 Polygraph

The term ‘polygraph’ literally means ‘many writings’. It refers to the way in which carefully chosen physiological activities are simultaneously monitored (Gordon & Fleisher, 2011:297). It also refers to the “entire environment within which a qualified polygraph examiner renders an expert opinion as to the truthfulness of an examinee’s

statements with regard to the primary issue in the matter under investigation” (Quality Polygraph Services, 2012:6).

Additionally, 'polygraph' refers to the commercial trade name for the apparatus that was manufactured by Leonard Keeler, who in 1926 developed a device that was adept at recording blood pressure, pulse rate and respiration (Quality Polygraph Services, 2012:CESO01(A) 12 of 14 and CESO01(B) 6 of 8). The Federal Examiner Handbook (2011:8) defines the polygraph as “a diagnostic instrument that is used during a PDD examination”. It monitors, records and/or measures at a minimum breathing, electrodermal and cardiovascular activity as a response to verbal or visual stimuli.

Within the South African context, the National Strategic Intelligence Act 39 of 1994 Section 2A (4)(b), the polygraph is defined as “an instrument used to ascertain, confirm or examine the truthfulness of a statement made by a person”.

1.6.6 Polygraph examination/ Psychophysiological Detection of Deception examination

The Federal Examiner Handbook (2011:8) describes a Psychophysiological Detection of Deception examination which is commonly known as a polygraph examination as comprising an interview as well as the testing process, which includes all the activities that occur between a polygraph examiner and an examinee during a sequence of interactions that include a pre-test interview, the use of the polygraph instrument to collect and record physiological data from an examinee while presenting a sequence of tests, the test data analysis, and the rendering of a professional opinion.

A typical valid polygraph examination therefore consists of three phases, namely the pre-test interview, data collection, and test data analysis. There is nothing during this process that prevents the presentation of admissions or other information obtained during a polygraph examination as evidence (APA bylaws, 2014a:1).

1.7 RESEARCH APPROACH

There are main three approaches to research: the qualitative approach, the quantitative approach, and a third approach – the mixed methods approach, which integrates the fundamentals of the quantitative and qualitative approaches, respectively, and has been gaining momentum in recent years (Creswell & Creswell, 2018:np; Edmonds & Kennedy, 2017: xiv-xv; Creswell, 2014:4).

According to Creswell (2014:4), quantitative research is an approach for testing objective theories by examining the relationship among variables which can be measured, usually on instruments, so that numerical data can be analysed by the use of statistical procedures. The final written report has a set structure. Leedy and Ormrod (2015:95) concur that quantitative research typically tries to measure variables in a numerical way.

Creswell (2014:4) defines mixed methods research as an approach that amalgamates both quantitative and qualitative forms of research. It does not merely collect and analyse quantitative and qualitative data, but involves the use of both approaches in tandem, so that the overall strength of the study is greater than either quantitative or qualitative research would be, individually.

While all three approaches have their merits, advantages and disadvantages, the qualitative approach was adopted in this study for the following reasons:

- Saunders, Lewis and Thornhill (2016:168) assert that qualitative research is interpretive, and assists researchers in making sense of the subjective and socially constructed meanings expressed regarding the phenomenon being studied. Qualitative research is naturalistic, as it aims to study people's everyday life in their natural setting. Mohajan (2018:2) posits that qualitative researchers pay attention to people's perspectives with regard to the way in which people believe make sense of their world and their experiences in it. In order to understand and establish rapport with the research participants, that is, IOs within the SAPS, the researcher interviewed the participants in their work environment.

- Crompton (2019:37) adds that qualitative research is the kind of research which uses methods such as participant observation to observe and record people's behaviour either in natural settings or by means of various kinds of narratives such as interviews. Qualitative research can be regarded as an approach appropriate for exploring and understanding the meaning individuals or groups attribute to a social issue. The research process involves emerging questions and procedures, data collection in the participants' settings, analysing the data inductively, building from particulars to general themes, and interpreting the collected data. The final written report has a flexible writing structure (Creswell & Creswell, 2018: np). As polygraph is a relatively under-researched field in the SAPS, it was important to understand the perceptions and experiences of the participants. Consequently, there were emerging themes and questions that needed to be addressed. It was also imperative that the final report be presented in a manner which the participants and the SAPS would also be able to identify with and understand.
- The qualitative approach refers to research that focuses on the participants' accounts of meaning, experience or perceptions, by producing descriptive data in the participants' own written and or spoken words, thus involving the identification of the participants' beliefs and values that underlie the phenomena. Qualitative researchers explore experiences, perceptions and understandings rather than facts or explanations (Quinlan, Babin, Carr, Griffin & Zikmund, 2015:266). Aspers and Conte (2019:153) further emphasise that, in qualitative research, understanding is the core concept which refers to both the conditions of knowledge and the outcome of the process.
- The design, which is flexible and unique, evolves throughout the research process, as there are no fixed steps that should be followed, and the design cannot be exactly replicated (Taylor, Bogdan & DeVault, 2016: 43). As this study explored the relatively novel discipline of polygraph tests within the SAPS, understanding the views of the participants necessitated a flexible design, and not rigid steps that could impede on gaining an in-depth insight into the world of an investigator using the polygraph as an investigative aid in a criminal investigation.

- Qualitative data is empirical as it documents real events, records what people say, observes behaviour, studies documents, or examines visual images (Neuman, 2014:177). In this study, the researcher sought to determine the SAPS investigators' perceptions and experiences with regard to the application of the polygraph in criminal investigations by predominantly conducting interviews and studying documents. The participants' experiences and perceptions produced descriptive data in the form of the written and/or spoken word. Consequently, analysing the descriptive data statistically and presenting it numerically would have been impractical. In addition, it would not have enabled the researcher to present the findings effectively as to whether or not the polygraph is a beneficial and viable investigative tool in criminal investigations within the SAPS.

Qualitative research can therefore, theoretically speaking, be described as an approach, rather than a design or set of techniques. Qualitative field studies can be used successfully in researching groups, small communities and organisations. Qualitative research aims to generate new concepts and theories (Mohajan, 2018:2).

Researching the SAPS investigators' perceptions and experiences of the polygraph in the context of South Africa, did not perceptibly fit into any particular theory. This research was therefore explorative, as it endeavoured to understand the perceptions and experiences of investigators regarding polygraph examinations as a diagnostic aid in criminal investigations. Understanding was also sought with regard to why certain SAPS investigators use polygraph examinations, where many others opt not to make use of polygraph examinations, as a diagnostic aid in their investigations.

An approach such as the qualitative approach, that lends itself to flexibility, was ideal in this research, as the researcher was encroaching on an area that is not necessarily transparent to a person outside the polygraph and law enforcement fraternity. Coupled with the background of an investigator and experience as a polygraph examiner within the SAPS, the researcher was confident that she was in a good position to gain the confidence of investigators within the SAPS, to explore and understand their perceptions and experiences of the polygraph in criminal investigations.

1.8 RESEARCH DESIGN

A research design describes how the study was conducted. It summarises the procedures for conducting the study, which includes when, from whom, and under what conditions the data was obtained. In other words, the research design specifies the general plan of how the research was set up, what happened to the subjects, and what methods of data collection were used. The purpose of the research design is to detail the plan for generating empirical evidence that is used to answer the research questions. The intent is to use a design that results in drawing the most valid, credible conclusions from the answers to the research questions. The research design is a vital part of an investigation because it involves the whole planning of the research – which entails the overall structure being followed by the research, the data the researcher collects, and how it is analysed (Leedy & Ormrod, 2015:92).

As the qualitative research approach does not generally provide the researcher with a step-by-step plan or fixed steps to follow, the researcher's choices and actions decide the design. It is during the research design phase that the researcher constructs the research design most suited to the research, or even designs the entire research project around the selected strategy. Various researchers have identified a number of design options, but according to Creswell & Creswell (2018:np), there are five qualitative research designs: narrative research, phenomenology, grounded theory, ethnography and case study.

The research design selected for this research was grounded theory. Although the characteristic of qualitative research is detailed description and analysis of phenomena, grounded theory goes beyond the description, to develop comprehensive concepts that relate to a particular phenomenon. The researcher mainly collects interview data by making visits to the field. The preliminary data collection is done to obtain a range of perspectives on the phenomenon. The researcher then uses constant comparison to analyse across categories of information. Data is collected until the categories of information are saturated. Once data collection has ended, a review of literature would provide another opportunity for comparison (Babbie, 2017:109).

Roman, Osinski and Erdmann (2017:999) posit that the method is used essentially for empirical problems, and the results are mainly built through the experiences and perceptions of the participants of the research. In this study it was envisaged that the theory would develop from the data. The researcher would be flexible and open to expect the unexpected, as the polygraph in South Africa is not a popular research field within the law enforcement community. Consequently, little was known about the study at the onset, although regular use is made of the polygraph in criminal investigations.

1.8.1 Unit of analysis

Kumar (2018:70) describes units of analysis as persons or objects from which the researcher would want to collect data, and it answers the questions of what and who is being studied. The unit of analysis plays an important role in the selection of a sample, data collection methods and the deductions that can be made from the research.

According to Kumar (2018:71), when the unit of analysis is not clear to the researcher, then the following happens:

- The research problem cannot be clearly identified.
- The sampling method is difficult to identify.
- There is difficulty in selecting the right measuring instrument.
- The researcher cannot decide on valid data analysis options.
- The results cannot be generalised to the whole population.

This is supported by Wrench, Thomas-Maddox, Richmond and McCroskey (2016:129), who indicate that correct identification of the unit of analysis is essential, in order to maintain focus during the research project, and to enable generalisability of the results to similar units. The unit of analysis in this study was the perceptions and experiences of the SAPS investigators.

1.9 RESEARCH METHODS AND DATA COLLECTION

The data collection steps encompass setting boundaries for the study, collecting information through interviews, documents and visual materials, as well as establishing the protocol for recording information (Creswell & Creswell, 2018:np; Creswell, 2014:189).

Ideally, purposefully selected sites, participants, documents or visual material are proposed for the study to assist the researcher in understanding the problem and the research question. In many qualitative studies, researchers collect multiple forms of data. The data collection procedures in qualitative research involve four basic types, namely observations, interviews, documents and audio-visual materials (Creswell & Creswell, 2018: np; Creswell, 2014:189).

In grounded theory, when data collection and theorising are combined, theoretical questions arise that may suggest future observations; therefore, new data is tailored to answer theoretical questions that come from thinking about previous data. As grounded theory is a type of inductive crime and justice theory that is often used in qualitative research, it builds towards abstract theory by making comparisons of ground-level empirical observations.

The primary methods of data collection in this research will be interviews and the evaluation of documents, for the following reasons:

1.9.1 Interviews

In this study, face-to-face interviews which entailed one-on-one and in-person interviews that were semi-structured, were used. The participants interviewed were investigators from within the SAPS, with at least two years' experience in investigations. They were able to provide historical information and relate their experiences, and the researcher was able to control and direct the line of questioning.

1.9.2 Document analysis

Document analysis is the study of existing documents that involves the systematic analysis of data in the form of documents or data drawn from documents (Quinlan et al, 2015:151). According to O'Leary (2017:496), document analysis involves reviewing, interrogating and analysing various forms of written texts as a primary source of research data. The author indicated that documents can be policy documents, organisational communication documents, media documents, historical documents, and more. In this study, police databases, police registers, and/or court documents where polygraph examinations were used in criminal investigations over a three-year period from 2015 to 2017, were analysed.

1.9.3 Field notes and memoranda

According to Birks and Mills (2011:77), many grounded theorists embark on work in the field even if it is only to interview participants in their own environment. Fieldwork encompasses a wide range of data-generating activities that include observation, informal conversations and formal interviews. Memoranda in grounded theory research chronicles thoughts, feelings, insight and ideas in relation to the research project, and are an important factor in ensuring quality in grounded theory. In this research project, field notes were made, as the participants who are investigators in the SAPS were interviewed in their working environment. In addition, throughout the research project, the researcher kept a research journal to record activities that supported an audit trail of the research.

1.10 POPULATION AND SAMPLING PROCEDURES

Brynard et al (2014:57) define population as “a group in the universe which has specific characteristics”. The universe refers to all subjects who have the attributes that the researcher is interested in; therefore, it can be stated that the population for a study is that group that the researcher is interested in generalising about (Babbie, 2017:202).

The population is the object of study, which may consist of individuals, groups, organisations, human products and events, or the environment to which they are

exposed. A population is the full set of cases from which a sample is taken (Leedy & Ormrod, 2015:184; Leavy, 2017:77). The population in this research comprised investigators from the SAPS with at least two years' experience in investigations.

It is impractical and uneconomical to involve all the members of the population in a study. Consequently, data is obtained for a sample of the population. In order for results to be generalisable, the sample must be representative, implying that the sample must have the exact properties in the exact proportions as the population from which it was drawn, but in smaller numbers. A representative sample is therefore a miniature image or likeness of the population (Edmonds & Kennedy, 2017:19; Brynard et al, 2014:57).

An average of 120 applications for polygraph examinations in criminal cases are received annually from investigators within the SAPS. The sample in this study comprised ten (10) investigators who have used polygraph examinations in their investigations, and ten (10) investigators who have never used polygraph examinations in any investigation. The sample therefore consisted of 20 SAPS investigators.

The primary purpose of sampling is to collect specific cases, events or actions that can clarify and deepen understanding. Qualitative researchers are concerned with finding cases that will enhance what the researcher learns about the processes of social life in a specific context. It is for this reason that qualitative researchers tend to use non-probability sampling. The researcher rarely determines the sample size in advance, and has limited knowledge about the larger group or population from which the sample is taken. The qualitative researcher selects cases gradually, with the specific content of a case determining whether it is chosen (Neuman, 2014:246-247).

A sample is also used to simplify the study, and save time and costs, as it would be a nearly impossible task to observe, interview or use questionnaires to gather data from every element in the population (Brynard et al, 2014:56). Neuman (2014:273) identifies eight non-probability sampling techniques, namely convenience, quota, purposive, snowball, deviant case, sequential, theoretical and adaptive.

In this study, the sample selected was investigators identified by the researcher, based on her experiences and interaction with investigators in the SAPS. Theoretical sampling, which is unique to grounded theory research, and is an essential method responsible for making the process develop, was used, as that which the researcher is sampling is carefully selected as the grounded theory develops (Birks & Mills, 2011:69).

1.11 DATA ANALYSIS AND INTERPRETATION

It is maintained that one analyses and interprets data in order to come to conclusions that reveal the thoughts and concepts that instigated the study in the first place (Maxfield & Babbie, 2011:112). Hofstee (2010:117) is of the opinion that, upon attainment of the data, the researcher needs to work with it for it to become evidence. In other words, the researcher needs to analyse the data. In qualitative research, the data obtained needs to be described, as well as mentioning any biases, limitations or weaknesses. A statistical analysis of the data then needs to be performed. In addition to this, an analysis of the literature can also be done.

Creswell (2014:195) indicates that in order for one to make sense of data and image data, one has to segment the data and take the data apart, as if one is peeling an onion, as well as putting it back together. At this phase of the research, the amount of raw data is condensed. Significant information is separated from less important information, and patterns are identified in order to reveal the real meaning of the information collected (Schurink, Fouché & De Vos, 2011:397).

According to Birks and Mills (2011:89), in grounded theory data analysis there are two rules, namely that everything is a concept, and that data analysis must proceed in relation to the research question, aims, and unit of analysis planned for in the initial research design which will be followed in this research.

Flynn and Korcuska (2018: 103-104) indicate that when using grounded theory, the process of data analysis is an inductive process which begins with substantive coding. This means that the process of coding enables the data to develop into an emergent

theory. The constant comparison process is continued until theoretical saturation is reached – in other words, when no further data fits into the concepts and categories. When this is attained, a theoretical framework is generated with the help of interpretative procedures, and well-developed, analytically related categories are derived through statements of relationship, before being described in the narrative.

In this study, the data obtained from the literature, questionnaires and interviews were analysed, in order to identify patterns, similarities and differences for organising the gathered data for analysis and interpretation.

1.12 VALIDITY, RELIABILITY AND ACCURACY OF COLLECTED DATA

Validity which means truthfulness refers to the accuracy and/or the correctness in research (Neuman, 2014:210). Brynard et al (2014:50) add that validity refers to the potential of a design or an instrument to attain or measure that which it is supposed to achieve or measure. It is focused on the ‘what’ of the data collection procedures and measures.

Before a research study begins, it must be ensured that the measurement procedures and instruments are both valid and reliable in order to produce appropriate data (De Vos, Strydom, Fouché & Delport, 2011:172). Maxfield & Babbie (2011:136) maintain that reliability is evident when a specific measurement method provides the same results every time when applied to the same thing. In other words, it denotes consistency. On the other hand, validity refers to whether or not one is measuring what one claims one is measuring (Maxfield & Babbie, 2011:139).

Creswell (2014:201) goes on to suggest that qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures, while qualitative reliability indicates that the researcher’s approach is consistent across different researchers and different projects. Yin (2004) (as cited in Creswell, 2014:203) suggests that qualitative researchers must document the procedures of their case studies, and document as many of the steps of the procedures as possible. Validity of a research study is achieved when the research instrument measures what it is supposed to be measuring (Quinlan et al, 2019:44).

Guthrie (2010:11) defines reliability as the ability to replicate the same results when the same techniques are used, so that the same results would be obtained when repeated by other researchers. Reliability is concerned with the accuracy and consistency of measures. The same instrument must be able to generate the same data at a later stage under similar conditions (Brynard et al, 2014:50).

Babbie and Mouton (2001) (as cited in De Vos et al, 2011:380) suggest that reliability and validity can be tested by authors reading and critiquing their own work, comparing documents and data, and corroborating information by interviewing witnesses, informants or knowledgeable individuals.

In this research undertaking, reliability and validity were ensured by using a tape recorder during the interviews to capture a verbatim transcription of each interview. The findings were presented to the participants to comment on the accuracy, and all transcripts were checked for errors and/or omissions. In addition, reliability and validity were further tested by the researcher reading and assessing her work, the supervisor reviewing and critiquing the work, and by corroborating the collected data through interviewing knowledgeable individuals from the participating organisations.

1.13 ETHICAL CONSIDERATIONS

The word ethics is derived from the Greek word 'ethos' which means character (Leavy, 2017:24). Davies, Francis and Jupp (2011:283) state that ethics are standards that should be applied towards others when conducting research. These standards are guidelines as to how researchers should behave in their quest of concealed issues of interest, especially if these issues involve human beings. It is safe to say that research ethics should be a primary concern of all social science researchers in planning, designing, implementing and reporting research with human participants. Researchers are duty-bound to acquaint themselves with what is right or wrong when conducting research.

Additionally, researchers also have the responsibility to treat participants in a study in a way that is morally correct. Neuman (2014:145) concurs that ethical issues are the concerns, dilemmas and conflicts that arise over the proper way to conduct research.

This research endeavoured to adhere to the following ethical considerations:

1.13.1 Obtaining approval

As required in the SAPS National Instruction 1/2006 Research in the Service (2006: 1-5), the researcher obtained permission from the SAPS to conduct the research (refer to Appendix A and Annexure B for proof of permission) and from the Ethical Committee at the University of South Africa (Unisa) (refer to Appendix C for the ethical clearance certificate).

1.13.2 Informed consent

Informed consent refers to correct and complete information being communicated to the participants so that they are in a position to fully comprehend the investigation. This would subsequently enable the participants make a voluntary, thoroughly reasoned decision regarding their participation. Participants must be aware that they can withdraw from the research at any time as their participation is voluntary (Neuman, 2014:151).

In this study, the necessary permission was obtained from the SAPS and the participants, after they had been thoroughly and truthfully informed about the purpose of the interview and the research. The participants (SAPS investigators) were further informed in detail of the intention and process of the research study, and that their permission to be part of the research was being requested (refer to Appendix D for the participants' assent forms). They were also told that their participation was voluntary, and that they could withdraw at any time from the research.

1.13.3 Anonymity, confidentiality and privacy

Anonymity must be ensured, whereby the researcher protects the privacy of the participants by not disclosing a participant's identity after information has been gathered (Neuman, 2014:154). According to Liamputtong (2013:41), the purpose of confidentiality is to conceal the true identity of the participants. Participants should be

protected by the researcher. Participants' names are not recorded, nor are the subjects connected by their identities with information from files or interviews.

Confidentiality must be guaranteed. The identities of the participants are not revealed, but information gathered would be linked to the given participant's identity (Neuman, 2014:155). Throughout the study, every effort was made to protect the privacy of the participants, as information collected was not associated with the participants. The participants were further informed that their identities would remain anonymous. All data collected was stored securely in a password-protected computer. Furthermore, all the data sources were only accessible to the researcher, as information in certain investigations was sensitive and/or confidential.

1.14 LIMITATIONS OF THE STUDY

Limitations of a study relate to possible weaknesses that are generally beyond the researcher's control. Weaknesses may be associated with the selected research design, statistical model constraints, funding constraints, or any other issues. Consequently, a limitation is considered an 'imposed' restriction which in essence cannot be controlled by the researcher (Theofanidis & Fountouki, 2018:156).

It is important to note that this study, as in many other studies, limitations were experienced but the limitations did not have an impact on the study design, results or conclusion.

This study encountered the following limitations:

- Time constraints. Due to the workload of IOs, the interviews were confined to thirty minutes;
- As a result of financial constraints, the study was confined to just one province, KwaZulu-Natal, although polygraph examinations are conducted nationally; and
- Owing to a dearth of polygraph research in South Africa, there was not much recent literature available. Consequently, the majority of literature presented in this study was from abroad and some were older than ten years.

1.15 DISSERTATION LAYOUT

This dissertation is divided into five chapters:

Chapter 1 of the dissertation encompassed an introduction and background, which involved a discussion of the research problem and rationale, the research aims and objectives, the definition of key concepts, the motivation for the research, research approach, the research design, research methods and data collection, data analysis , ethical considerations and finally the limitations of the study,.

Chapter 2 gives the theoretical framework within which the study's perceptions and experiences of investigators regarding the application of the polygraph in criminal investigations, are presented. Explanations and contextualisation of key concepts and the literature review are also included in the chapter.

Chapter 3 details the research design, measures to ensure trustworthiness, ethical measures, the methods of data collection, and data analysis strategies.

Chapter 4 presents the research findings of the study, which encapsulates the presentation and discussion of the research data, and the findings within the grounded theory theoretical framework are presented.

Chapter 5 concludes the research by presenting a summary and recommendations as to how the polygraph can be optimally used within the SAPS by investigators as a diagnostic aid.

References and appendices are included after Chapter 5.

1.16 SUMMARY

This chapter provided an overview of the study by outlining the justification for the study, research questions, clarification of key theoretical concepts and the research framework.

The research into the polygraph as an investigative aid in criminal investigations, regarding perceptions and experiences of investigators in the SAPS, has been considered necessary, due to the high levels of crime in South Africa. It has thus become crucial for investigators in the SAPS to optimally use all investigative aids that are accessible and available to them, including the polygraph.

This study endeavours to contribute to the research on the polygraph in South Africa, especially within the SAPS environment. In the 20 years that the polygraph has been advocated as an investigative aid for investigators, there have been no studies/research or investigations conducted within the organisation to determine whether or not the polygraph has proved to be a viable and beneficial diagnostic aid in criminal investigations. This research study also endeavours to make recommendations as to how the polygraph can be used optimally in criminal investigations within the SAPS by investigators.

This research was exploratory, as there was a lack of research within the law enforcement community in South Africa. It therefore focused on the following: the perceptions and experiences of investigators in the SAPS regarding the application of the polygraph in criminal investigations; the application of the polygraph as an investigative aid and the extent to which it is used by SAPS investigators to resolve criminal cases opened by the general public and/or in internal departmental criminal investigations; and, whether or not it has helped to solve cases by giving direction and/or focus to the investigator when an investigation has deadlocked.

As outlined in this chapter, the researcher will unravel the perceptions and experiences of investigators in the SAPS regarding the application of a polygraph in criminal investigations, in the coming chapters, beginning with a literature review in Chapter 2. The literature review endeavoured to present relevant and applicable literature by presenting further insight from a variety of sources. This enabled the researcher to specify where and how the research fits in the broader polygraph community in South Africa, and, more specifically, within the SAPS.

Chapter 2

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 INTRODUCTION

For as long as the world has been populated by human beings, deception has been a fundamental part of everyday life. Granhag and Strömwall (2004:3) stated that the “truth is generally considered to be rare and beyond our reach, for lying is human and it is for this reason justifiable that people are fascinated by lies and how to detect them”. Most people not only lied habitually, but also often reflected upon, and made decisions regarding, questions of truth and deception (Granhag & Strömwall, 2004:3). It was for this reason that studying deception has grown to be such a popular topic in psychology, physiology, human communication, philosophy, psychiatry, linguistics, law and criminology.

In recent years, at several international conferences such as those organised by the European Association of Psychology and Law, and the American Psychology-Law Society, ‘deception detection’ has regularly featured as one of the topics for discussion. Scientific journals in fields such as law and human behaviour, legal and criminological psychology, and psychology, crime and law, regularly publish papers on deception (Granhag & Strömwall, 2004:5-6).

Owing to the quest by humankind to detect deception, the usage and subsequent expansion of lie detection and truth verification procedures and techniques by law enforcement agencies and academics tasked with the investigation of crime and illicit behaviour, may be traced back more than a century (Granhag & Strömwall, 2004:4). In the present day, many countries, South Africa included, used the polygraph as an investigative tool in pursuit of the truth (Tarase, Haveripeth and Ramadurg (2013:8).

In this chapter, the theoretical framework of this study, entitled "The perceptions and experiences of investigators regarding the application of polygraph in criminal investigations", is presented. Explanations and contextualisation of key concepts and a literature review is also encompassed in this chapter. The development and use of

the polygraph (nationally and internationally) was traced by reviewing a variety of sources, including professional journals, scholarly books, government or public documents, dissertations and electronic resources, to sensitise the reader to inconsistencies and shortcomings that justified further research in this discipline. As Sullivan et al (2012:82) suggested, a thorough and systematic review of the literature was conducted to ascertain what was already achieved in the field of interest, to understand questions that people interested in the subject matter have been asking, as well as to grasp the issues that were relevant in the area of interest.

According to Munhall and Chenail (2008:7), the theoretical framework of the study was responsible for the structure within which the existence of the identified issue under investigation, as well as the outcomes emanating from the empirical study, may be expounded, as it was the result of an assortment of interrelated concepts. The framework played a vital role in exploratory studies, because the researcher may be unfamiliar with, or inexperienced in, the subject matter, and was is trying to acquire a better understanding thereof.

The theoretical basis of the subject under investigation provided details for the questions relating to how and why sense was made of the information. This study, which hinged on the perceptions and experiences of investigators regarding the application of the polygraph in criminal investigations, is presented in this chapter. Explanations and contextualisation of key concepts, as well as an evaluation of current available literature internationally and locally from a variety of sources, endeavoured to provide further insight into how and where this study fitted in the broader polygraph community in South Africa, and more specifically within the SAPS.

The key concepts that were important for further understanding and contextualisation were deception, perceptions and understanding the roles and responsibilities of investigators.

2.2 CONTEXTUALISING DECEPTION, PERCEPTIONS AND THE ROLES AND RESPONSIBILITIES OF INVESTIGATORS

Before an attempt could be made to delve into any study of the polygraph, it was important to understand why the discipline had attracted so much controversy over the years, even though it was so widely applicable and popular in the detection of deceit, predominantly in the law enforcement environment. The reality is that no individual could attest to never having told a lie. In fact, lying was considered a fact of day-to-day life. Most often, lying was self-orientated, which was intended to make a deceptive person appear better to others or to gain personal advantage. People also lied with the intention to make others look better or for the benefit of another, such as an innocent person telling a police official that they were responsible for an offence, to protect a loved one from being apprehended (Vrij, 2007:11; De Paulo et al, 2003:74).

Human beings also lied to preserve social relationships because it would be rather awkward and uncomfortable if people had to be brutally truthful to one another all the time. For instance, if a sales assistant in a clothing store had to tell a customer that she looked fat or that a particular outfit did not suit her, the salesperson would not only lose the sale, but they would also have offended the customer in the process. It is therefore sometimes necessary to make deceptive but gratifying remarks (DePaulo, Kashy, Kirkendol, Wyer & Epstein, 1996:979-995).

It was also expounded at length by Vrij (2007:16-27), that the frequency of lying depended on the deceptive individual's personality, the circumstances and background within which the lie was being told, and to whom the lie was being told. In addition, people who were identified as extroverts lied more often than those considered to be introverts, but there were no gender differences identified in the frequency of lying. It was found that males and females told different types of lies, with females telling more social lies.

2.2.1 Deception

It was important that one had a thorough understanding of deception, as the use of the polygraph has gained impetus in recent years as a result of people's need and

desire for the detection of deception. Grubin (2010:446) described people as generally poor “lie detectors”. In experimental locales, the aptitude of an ordinary person to detect a deceptive individual was found to be a little more than chance, at just above 60 percent. In the laboratory environment, judges, police officials, American federal law enforcement officers and customs officers who were considered to be professional ‘lie catchers’, did not outperform university students when it came to detecting deceit.

Mitchell (1986:3) defined deception as “false communication that tends to benefit the communicator” whereas De Paulo et al (2003:74) postulated that deception was defined as “a communicator’s deliberate attempt to foster a belief or understanding in others which the recipient considers to be untrue”. Vrij (2007:14) elaborated that deception as an intentional act also implied that if two people contradicted each other, it did not inevitably mean that either one of them was lying. In a criminal case, people who may have witnessed the same event may in fact recall the event to some extent in a different way from each other to such an extent that their versions may be contradictory. This did not necessarily imply that either person was being deceptive, but that the circumstances were interpreted differently.

Furthermore, lying did not essentially necessitate the use of words. For instance, a sports participant who faked an injury after a poor performance and wobbled off the ground was being deceptive without using words. It is likewise conceivable to lie by concealing information, but it has to transpire intentionally. As a case in point, a taxpayer who calculatingly did not declare a specific source of earnings on a tax return was mendacious; however, if the person unintentionally forgot to divulge the information, it was not lying.

Vrij (2000) (as cited in Memon et al, 2003:9) highlighted that people lied for at least five reasons:

- to have a personal advantage, such as a business person who concealed the real financial state of the company so as not to discourage shareholders;
- to avoid punishment such as when offenders were deceptive regarding their participation in a criminal activity in an interview with police, in an attempt to evade punishment;
- to impress other people;

- to shield themselves from shame or condemnation; and
- when they were not willing to accept responsibility for a futile error.

It was important to understand the rationale of deception, as it is the fundamental reason for criminal investigations, especially in the law enforcement sector. The Constitution of the Republic of South Africa Act 108 of 1996 made provision for the SAPS to do the following:

- Avert, fight, and probe crime.
- Investigate any illegal/illicit activities that may be a threat to the safety and security of society.
- Make certain that offenders were brought to justice.

The Code of Conduct for the SAPS further stipulated that members within the SAPS committed themselves to creating “a safe and secure environment for all people in South Africa” (Faull, 2017:2; SAPS, 2018:1). One of the ways emphasised to uphold the commitment to a safe and secure country was by “investigating criminal conduct that endangers the safety or security of any community; and bringing the perpetrators to justice” (Faull 2017:2; SAPS, 2018:1). Individuals who committed crimes generally attempted to evade detection, and it was the duty of the SAPS investigating officer to solve criminal activities by uncovering the deception and apprehending the criminal.

2.2.2 Roles and responsibilities of investigators

According to the 2017/2018 SAPS Annual Performance Plan (SAPS, 2018:40), the Detective Service was responsible for supporting the investigatory work of the SAPS, which consisted of giving support to investigators by way of the collection, processing and analysis of forensic evidence. The strategic objective was therefore to help ensure that offenders were successfully prosecuted – which was achieved by way of investigation, collection and analysis of evidence. IOs in the SAPS were tasked with the investigation of criminal offences that have been reported by the community.

The SAPS learner’s guide (SAPS, 2009:405) described an IO as a member of the SAPS who was the main investigator of a case with the responsibility of maintaining the case docket. Brown and Davenport (2012:7) elaborated further that IOs made use

of scientific methods to observe and collect physical evidence at a crime scene. After evaluating a crime scene and surrounding areas, an IO developed a hypothesis in an attempt to answer the “who, what, why, what, when and how did it happen” questions.

Sennewald and Tsukayama (2006:3) described a criminal investigation as the “examination, study, searching, tracking and gathering of factual information that answers questions or solves problems”. It was therefore the duty and responsibility of investigators to do the following: gather, document and evaluate factual information about an offence by establishing that a crime was in fact committed; identify and apprehend the offender/s; and, to assist the state in prosecuting the offender/s indicted with the offence (McMahon, 2014:3).

Palmiotto (2012:6-8) who referred to a criminal investigation as a thinking and reasoning process as it was an investigator’s principal objective to collect facts about the crime. The task of gathering facts was accomplished by the collection of accurate information pertaining to the particular offence. The preliminary steps were descriptive in nature. During this stage, the investigator described things and persons present without inferring any conclusions about the offence. The investigator accumulated documents and evidence, and reviewed the facts by evaluating all the details of the crime scene cautiously and thoroughly, after which the gathered facts were linked to the crime.

In order to finalise the investigation successfully, the investigator generated hypotheses which linked one fact to another, and then, by linking the hypotheses, constructed a theory that explained the crime as a whole. It was imperative that the information collected was used to determine the facts of the offence. A good and thorough investigator should be able to observe ‘the crime scene’ prudently, noting what was present and what was missing, in order to establish that facts that linked all the facts and proof to the suspect/s liable for the criminal act (Palmiotto, 2012:6-8) .

Orthmann and Hess (2013:11) and Lyman (2011:26) concurred and elaborated further that the role of the IO included deciphering what happened and why, analysing evidence from the crime scene, identifying and locating witnesses, determining what

further investigative steps should be pursued, identifying, tracing and arresting suspects, and finally testifying legal proceedings.

Indeed, specifically, the SAPS investigators were mandated to solve criminal offences, and in order for them to execute their duties and functions optimally, they needed expertise and skills. At their disposal, was an assortment of investigative aids, which included the polygraph. As the polygraph was a rather provocative investigative tool, not many investigators were keen to utilise it, as the potential value of polygraph as a viable diagnostic aid was not shared by all due to divergent views about discipline. Consequently, the way the polygraph was perceived by investigators had an impact on the extent to which it was used, as its potential value in a criminal investigation could be undermined by the negativity and controversy that surrounded the discipline.

2.2.3 Perceptions

It was the intention of this study to determine what the perceptions were of IOs in the SAPS regarding the application of polygraph. Before proceeding any further, it was imperative to understand what perceptions were, and how they influenced an investigator's decision about whether or not to use the polygraph in a criminal investigation.

Words that were associated with perception included insight, awareness, observation, view and opinion. From a psychological perspective, Wade and Travis (1990:156) described perception as the process whereby sensory impulses were organised and interpreted, telling the individual where one object began and another ended. According to Robinson-Riegler & Robinson-Riegler (2012:46), perception referred to the "psychological processes involved in the immediate organisation and interpretation of sensations", and sensations were "loosely associated with the psychological processes that underlie information undertake". Human beings absorbed facts and data through sight, hearing, touch, taste and smell. Information that was assimilated by way of the senses initiated the processing of information, but undoubtedly that which people saw and heard dominated their cognition. Woods (2000:236) postulated that perception was the process of interpreting, organising and expounding on sensory information.

Venter, Louw and Verschoor (2003:140-141) and Sternberg and Sternberg (2012:85) described perception as the way in which people recognised, organised and attached meaning to the information that was received by their senses from the environment at a specific point in time. Through the process of sensation, senses gathered information. Sensation could be considered primarily as a physiological process, while perception was more psychological and cognitive in nature. Sensation and perception were not two isolated processes, but were both part of a coordinated procedure through which a person acquired information in order to make sense of day-to-day life. It was vital to appreciate that the information processing was not merely a passive recording of events by means of a biological process. Factors such as context of the event, emotional state, past experiences, expectations and memory also contributed to the process. These factors added to a person's frame of reference, which was referred to as the perceptual set.

Venter et al (2003:142-143) further postulated that perception was characterised by a search for order and consistency. The intricacy of the perceptual process was generally only appreciated when information was unfamiliar or complex, because the simplest aspects of a given stimulus were the easiest to recognise and remember. Simplification and organisation occurred during perception. Interpretation by means of simplification and organisation could affect the recollection of information, recognition of stimuli, and processes that were responsible for making decisions, which could have an impact on a person. It was vital to recognise that the perceptual structure was not a passive structure that was waiting to be activated by an external stimulus. Rather, it was an active exploratory system that was striving for information from the environment, and was subsequently very selective about the information it gathered. Information was examined, interpreted and recorded, which made perception an active, creative and subjective process. Consequently, perceptions were often selective, and could therefore sometimes be inaccurate.

According to Bartol (1983) (as cited in Venter et al, 2003:144), expectations could affect perception because people were predisposed to perceive what they expected to see, and they tended not to perceive what they did not expect to see. This could be attributed to the fact that individuals had a tendency to have stereotyped beliefs, which were typically controlled by society's perceptions, prejudices and attitudes. Hale

(2008:6-9) stated, at length, that the way a person observed things – in other words, the way a person perceived things, was based only on their experiences. When one saw an object, one identified it due to past experiences. Perception was thus based on each person's view of the world around them. What one person sees is not necessarily, or always, what another person sees, because history, coupled with culture and experience, has an effect on an individual's view of life, which in turn has an effect on perception.

A brief explanation of perceptions and how they were shaped, as well as understanding the roles and responsibilities of investigators, was necessary. This study was based on the perceptions and experiences of investigators in the SAPS regarding the use of the polygraph as an investigative aid in criminal investigations. Clearly, from the definitions of perceptions presented, it could be deduced that perceptions that were formulated influenced the way people see and make decisions. Consequently, with the polygraph being such a provocative discipline, with proponents for and against it, this was bound to influence the decision of investigators as to whether they used or did not use the polygraph as an investigative aid in detection of the truth in criminal investigations.

2.3 LITERATURE REVIEW

Taylor et al (2016: 42) as well as Welman, Kruger and Mitchell (2005:39), indicated that the compilation of an analysis of research findings regarding a particular topic that has already been published, sensitised the researcher to discrepancies and flaws that justified further research. A thorough review enabled a researcher to specify where exactly the planned study fitted in. According to Sullivan et al (2012:82), a thorough literature review should be done to determine what had already been done in the field of interest, to understand the questions that people interested in the subject matter were asking, and to grasp the issues that were relevant in the area of interest.

Leedy and Ormrod (2013:51) posited that the more the researcher knew about investigations and perspectives that were relevant to the study, the more effectively the research problem would be addressed. Creswell and Creswell (2018:np), Yin (2016:71-73), Neuman (2014:126-127), Leedy and Ormrod (2013:51), Creswell

(2009:25), McMillan and Schumacher (2006:75-76), Welman et al (2005:39) concurred that a literature review was important for the following reasons:

- The results emanating from other similar studies were known.
- It helped determine whether other studies already addressed and/or answered the proposed research problem.
- The study was related to the larger, current discourse in the literature by addressing shortcomings and encompassing previous studies.
- It presented a framework for establishing the importance and impact of the study as well as determining the standard for the comparison of the results with other findings.
- The knowledge obtained from the literature reviewed also assisted in stating the significance of the problem.
- It enabled the researcher to define and limit the problem.
- It placed the study in a historical perspective.
- It avoided unintentional duplication of previous research.
- The researcher was provided with important facts and background information regarding the subject under study.
- If research on the same topic was previously conducted, the review provided information about aspects of the problem which were neither investigated nor explored previously.
- Insight regarding the weaknesses, problems and challenges of previous studies was gained.
- It revealed sources of data that the researcher may not have known existed.
- A researcher could gather ideas on how the investigation should proceed.
- In an exploratory study, a review provided the researcher with a foundation to determine variable relationships, types of relationships and measurement.
- The results and conclusions of previous studies could be evaluated, so that researchers could relate it to their own findings and conclusions.
- A review generally provided a motivation for the envisaged study.

2.3.1 Background to the polygraph

The desire and fascination to distinguish between truth and lies was not something new to modern society. Since bygone ages, humankind has been trying to decipher

ways to determine whether and when people were lying and/or being deceptive. In the early centuries (AD), primitive methods for detecting lies were based on superstition and religious faith; however, from the 1880s onwards, the approach became more humane and scientific. In the past 90 years since the case of *Frye v US* (1923), extensive research and development has taken place in the field of polygraph testing. Since 1980, a comprehensive compilation of research projects based on the validity and reliability of the polygraph technique, has been published by the APA (Gordon & Fleisher, 2011:313).

No one specific individual invented the polygraph. It is a discipline that has evolved over time, amalgamating physiology and psychology dating back many centuries, encompassing the work of several pioneers who formed the evolutionary chain of discoveries and development responsible for the present status of forensic psychophysiology (Krapohl and Shaw, 2015:25; Matte, 1996:87).

2.3.2 A brief overview of the evolution of the polygraph

One of the first papers on deception was an essay by Daniel Dafoe in 1730, where he stated that "taking the pulse" could be a more benevolent way to identify a criminal (Matte, 1996:11). It was only in the nineteenth century that an Italian physiologist, Angelo Mosso, presented worthwhile research findings which revealed that fear increased the movement of blood in the brain. It was Mosso who initially reported that under certain conditions there were fluctuations in the breathing patterns of an individual. Cezarre Lambroso, who was Mosso's mentor, did not confine their studies to the research laboratory, but applied their acquired awareness to assist the police identify criminals (Matte, 1996:11-12).

In 1908, Hugo Munsterberg, who was professor of psychology at Harvard University in the US, proposed that deceit may be recognised by way of physiological recording instruments. Italian psychologist, Vittorio Benussi made the next major contribution in a paper published in 1914 on findings regarding the respiratory symptoms of lying. He was the person who first used blood pressure, the heart rate and breathing to identify deception, showing that the observation of behaviour was no better than chance when

detecting deception, whereas deception could be established far more accurately by measuring and recording inhalation and exhalation patterns (Synnott, Dietzel & Ioannou, 2015:60).

In 1915, William Marston, an American scientist, built and operated a systolic blood pressure deception test. In 1917, the results of his research with systolic blood pressure, which involved the repeated inflation of a blood pressure cuff to obtain systolic blood pressure readings at intermissions in an examination for deception, was published (Quality Polygraph Services, 2012:7; McMahon, 2003:34;). It was during the World War I that the Secretary of War for the US used the polygraph in counter-intelligence investigations, with the assistance of Dr Marston. The work of Dr Marston inspired Dr John Larson, a policeman and physiologist at the Berkeley Police Department in California, who created the first polygraph in 1921. The device created by Dr Larson could concurrently record and measure constant changes in the respiration rate, blood pressure and heart rate to help detect deception (Synnott et al, 2015:60; Tarase et al, 2013:5).

In 1921, the polygraph began making headlines when Dr John Larson tested his device after several thefts were reported in the local college dormitory (Alder, 2007:4). Between 1920 and 1922, Dr Larson had tested 861 subjects in 313 cases corroborating 80 percent his findings by post-exam confessions or unspecified checks. A total of 218 criminal suspects were identified and 310 people were exonerated (Alder, 2007:26-27). During his early work, Dr Larson was assisted by his then protégée, Leonarde Keeler, who was recognised for initiating the first polygraph testing procedures. It was Keeler who was liable for transforming the polygraph instrument into a portable apparatus.

Over a 10-year period from 1920, Germany and Japan constructed various kinds of polygraph instruments. In 1936, it was reported that Father Walter Summers, from the Department of Psychology at Fordham University in New York, had carried out more than 6000 experiments in a laboratory setting, and almost 50 genuine polygraph examinations which comprised guilty and innocent offenders. The experiments yielded accuracy levels of between 98 and 100 percent. It was also acknowledged that in the early 1930s, the FBI began purchasing polygraph devices, and by 1942, Leonarde

Keeler had already started training military and police officials as polygraph examiners (Matte, 1996:25).

By 1953, the US Army was regularly conducting polygraph tests on members (Alder, 2007:218). For more than eight decades, some law enforcement agencies in the US have been using polygraph examinations predominantly as an investigative aid in criminal investigations, as well as in internal misconduct investigations that involved agency or department employees. Polygraph examiners were first used by the FBI in 1935 (US Department of Justice, 2006:iii). The first trained FBI polygraph examiners dated back to 1959, having conducted nearly eighty polygraph examinations per month by the end of 1960. In the 1960s, there were some 10 000 polygraph examiners, with almost half the US police departments using the polygraph. In recent decades, the polygraph finally began to make modest inroads outside the US, particularly with countries such as Canada, West Germany, Japan, South Africa and Israel having adopted the polygraph instrument for their military, police and criminal investigations (Alder, 2007:254).

The polygraph goes back more than one hundred years, with roots in the US. It is a discipline that encompasses instrumentation, technique, data analysis and science. It has evolved over time, amalgamating physiology and psychology dating back several centuries, encompassing the work of many pioneers who formed the evolutionary chain of discoveries and development responsible for the present status of the polygraph (Matte, 1996:87).

Contrary to popular belief, a polygraph examination did not detect lies. The fundamental purpose of the polygraph was to help the professional polygraph examiner identify areas of highest salience (Krapohl, 2010:1). The purpose of a polygraph examination was, therefore, to establish whether a person was being truthful or not. Admissions and confessions obtained in the process were an added bonus. Polygraph testing also enhanced the ability to obtain better and more detailed information. When used correctly, polygraph examinations could be more effective than any other tool currently being utilised to determine deception, and could also show who has or does not have information for an investigator to obtain/or follow (Nelson & Handler, 2014:25).

2.3.3 The polygraph instrument

Synnott et al (2015:62-650) and Memon et al (2003:21) stated that the polygraph apparatus had the capability to record very subtle changes that were associated with arousal which occurred in the body of a person in respect of sweating, respiration, heart rate and movement, by magnifying motions that were detectable by the sensors which were attached to carefully chosen sites on the body. It was the assumption that deceptive people were more aroused than people telling the truth. This may result in feelings of guilt because the individual was afraid that their lies would be detected by the polygraph. The National Research Council (2003:13) also asserted that the physiological phenomena of the polygraph did not proclaim that the device measures deception directly. It is understood to record and measure physiological reactions that were assumed to be greater when a subject was deceptive.

More recently, Sewsunker (2014:102) described the polygraph as a device that was capable of concurrently measuring and recording physiological activities. The data that was collected during the polygraph process consisted of the subject's relative blood volume, heart rate, sweat gland activity, and inhalation and exhalation rate. The polygraph instrument, in essence, collected the body's responses when a person was afraid of being identified as being untruthful. The philosophy behind the polygraph examination was based on the sentiment that physiological activity in the human body escalated when an individual was lying, and therefore the polygraph could identify the deception.

Slupski (2015:4) echoed the sentiment that the polygraph was founded on the principle that the fear of detection caused physiological changes to occur in a subject's body at or near the point of deception, and these physiological changes could be identified by a trained polygraph examiner. The physiological changes that occurred in a subject's body were monitored and recorded, using the polygraph instrument. The polygraph instruments presently in use were, at a minimum, able to simultaneously record two channels of physiological changes that take place in the respiration cycle: one channel of cardiovascular activity, as well as one channel of electrodermal activity and a movement sensor. A polygraph instrument was, in fact, not a 'lie detector', but a scientific diagnostic device consisting of a minimum of four sensors. The four sensors

were the pneumograph, which had two channels and recorded movement that was associated with respiration; the electrodermal activity component, which recorded the electrical resistance or conductance of the skin; the cardiosphymograph, which recorded fluctuations in the relative blood volume and rhythm rate; and, a movement sensor that recorded movement (APA, 2014a:4).

2.3.4 The polygraph examination

Grubin (2010:446) stated that there was always the presumption that when a person was lying, there were physiological activity occurring within the body of the deceiver. Due to this presumption, the detection of the physiological activity could be identified by means of the polygraph. The term 'polygraph' was derived from the Greek words *poly* which meant 'many' and *grapho* implying 'to write' (Sekharan, 2013:4). The polygraph was generally associated with controversy, as there was the belief that it was easy to manipulate and did not work (Grubin, 2016:98). Consequently, considerable deliberation regarding the polygraph has been tainted by ideologies, with both supporters and adversaries frequently exaggerating their viewpoints.

According to Vicianova (2015:526), the polygraph, which was universally recognised as a 'lie detector', did not identify lies, because there has never been any definite or particular physiological reaction to lying identified and/or verified. Instead, Vicianova (2015:526) argued that the polygraph recorded activities that were associated with stimulation that occurred within the autonomic nervous system of the human body. The reactions measured were neither exclusive to deception nor were they always stimulated by it. It was thus the duty of a polygraph examiner to determine a particular mindset which was known as a 'psychological set' in an examinee, where their fears, concerns and trepidations were channelled to the situation that held the utmost immediate threat to their general welfare (Grubin, 2016:98).

As a result of the established psychological set in the examinee, the chances were that any arousal which was observed to specific questions were the result of deceptive answers. Whether arousal was result of the fear of being wedged in a lie, a habituated reaction to the deed of lying, orientation to a matter of emotional salience, the

augmented reasoning processing necessary for deception, or some other issue, was uncertain (Grubin, 2010:447).

The US Department of Justice (2006:ii) described the polygraph as an examination procedure that used a diagnostic instrument which could measure and record the physiological reactions of a subject as questions were answered. The physiological reactions of subjects varied when they were speaking the truth and when they were being dishonest. By comparing the reactions of a subject to various questions, the polygraph examiner was in a position to distinguish reactions that could indicate deceptive responses to certain questions.

Lissitzyn (2008:285) concurred with other researchers and writers that the premise that the polygraph technique was based on an individual's conscious attempt to deceive various involuntary physiological changes due to the acute reaction in the sympathies of the autonomic nervous system. The modern polygraph theory was based on two assumptions, namely that there was an association between deception and some emotional states, and that there was a relationship between the identified emotional states and particular physiological changes that took place in the body that could be measured and recorded.

Despite the fact that the polygraph instrument could measure the physiological profile of an examinee, it could not, on its own, infer the nature of the basic psychological profile. It was the responsibility of the polygraph examiner to convert the physiological information generated during the polygraph examination into an assessment of truth or deception. This undertaking encompassed two distinct tasks. First, a polygraph examiner had to design and conduct a polygraph examination in a manner that the physiological data obtained was indeed related to the individual's deceitfulness, and was not their anxiety or any unrelated emotional reactions. Second, even though the information collected was connected to an examinee's deceit, a polygraph examiner should be capable of interpreting the data correctly (Lissitzyn, 2008:288).

Van Damme (2001:4) elaborated that the human body had a sophisticated survival system that ensured that it was in balance. Homeostasis, which was a self-regulating process by which biological systems in the human body maintained stability while

regulating to conditions that were conducive for survival, ensured that all organs of the human body, as well as fluids and chemicals, were balanced to enable it to perform their functions and duties. The hypothalamus, which was a vital portion of the brain, controlled this inner balance. Subsequently, the hypothalamus, which controlled the autonomic nervous system, subconsciously controlled activities such as breathing, sleep, the pulse, digestion, respiration and blood pressure. When human beings felt threatened, be it psychologically or physically, their senses associated with sight, hearing, instinct or feeling propelled distress indicators to the autonomic nervous system to actuate the sympathetic system into taking action. The body was then activated for 'fight or flight' mode.

It was thus the underlying principle in polygraph that the spontaneous and involuntary psychological reaction that the person experienced in a crisis was akin to the instinctive response of the body when the individual intentionally acted in a deceitful way. In theory, it implied that an individual's truthfulness or deceitfulness was determined by the physiological arousal exhibited in reply to the answers communicated to the questions asked during the polygraph examination.

When a person was afraid of getting caught lying, there were other obvious and noticeable effects that could be measured by the polygraph instrument, as described by Van Damme (2001:4):

- The salivary glands produced more and thicker saliva, which resulted in a dry mouth.
- Blood volume increased as the heart pumped harder and faster.
- Respiratory muscles were stimulated, which caused changes in breathing.
- Sweat glands were stimulated, which caused an increase in sweat gland activity.
- The bladder relaxed, while the anal and urinary sphincters decreased in size.
- There was a contraction of involuntary muscles.

A polygraph examiner was trained to measure, record and analyse these deviations that transpired in the body of a subject during the polygraph examination, which determined deception or non-deception. Janušauskas (2014:139) posited that

supporters of the polygraph proclaimed that the polygraph examination was reliable for the following reasons:

- Only a limited number of individuals could control all three physiological functions simultaneously; and
- Pre-examination examinations were conducted on the examinees that enabled the polygraph examiner to determine an individual's reactions when a lie was being told.

Janušauskas (2014:139) went on to point out that critics of the polygraph, on the other hand, asserted that people could camouflage stress even when they were cognisant of lying. There was no dependable manner to distinguish stress that was caused by the polygraph examination and the stress that was a result of a lie. Janušauskas (2014:139) further advocated that the polygraph was “not really a test of anything”. It could measure physical reactions; however, further than that, it was not known how the human nervous system acted when it was lying. Apprehension, fury, melancholy, humiliation and panic could all be compelling reasons that altered an individual's blood pressure, respiration rate and heart rate. Additionally, there were also medical conditions such as the common cold, influenza, pain, discomfort, or neurological and muscular complications, which could be the basis of the physiological changes gauged by the polygraph.

Some people may be fearful of the fact that the polygraph instrument would reveal dishonesty when they were in fact being truthful, and, consequently, they would be incorrectly accused of lying. It was also argued by critics such as Tredoux and Pooley (2001:819) that the theory of polygraph tests was vastly flawed, as an evaluation of polygraph evidence by the United States Congress' Office of Technology Assessment concluded that “there is no known physiological response that is unique to deception”.

2.4 TYPES OF POLYGRAPH EXAMINATIONS

Despite the negative critique of the polygraph, currently, it was predominantly used for two different reasons, namely for screening purposes and as an investigative aid. As it was used in two relatively different spheres, the appropriate type of polygraph must be determined to ensure the correct results. There were five different types of

polygraph examinations which were stipulated in the APA Standards of Practice (2018c:np).

2.4.1 Evidentiary examination

An evidentiary examination was conducted in circumstances where it was stipulated or agreed prior to the polygraph examination that the results were intended for use as evidence in a legal judicial proceeding (APA, 2012:14; APA, 2019:np). The polygraph examiner was therefore expected to provide a diagnostic opinion as an expert witness in a legal proceeding (Krapohl et al, 2012:33; APA, 2018c:np; APA, 2019:np).

2.4.2 Paired testing examination

Paired testing examinations were conducted at the same time by different polygraph examiners on two or more persons concerning a single significant disputed fact. It was used voluntarily by disputing parties to find a solution regarding the disputed facts (APA, 2018c:np). If both the polygraph examinations were entirely independent, meaning that both the polygraph examiners were not privy to the results at the time that the tests were conducted, and if the results of both the polygraph examinations concurred that one examinee was truthful and the other was not, then the statistical likelihood that both polygraph examinations were incorrect, was considered very low (APA, 2019:np; APA, 2012:8).

2.4.3 Investigative examination

An investigative polygraph examination was a broad term referring to any polygraph examination conducted in the milieu of an investigation that may be a criminal, background, screening, or incidental examination. Investigative examinations were also conducted in community safety examinations such as post-conviction sex offender testing and in domestic violence related cases as well as in routine specific issue and single issue or multi-faceted diagnostic tests (APA, 2019: np; APA, 2012:9; Krapohl et al, 2012:47). The function of an investigative polygraph examination was to provide assistance and guidance in an investigation and the results of investigative

examinations were not necessarily used as evidence in court proceedings (APA, 2018c:np).

2.4.4 Diagnostic examination

According to Slupski (2015:3), diagnostic examinations were investigative or event-specific evidentiary polygraph examinations that were conducted to help determine whether an individual had information, or was involved in an allegation that was reported. The examination focused on one or many aspects of an event. The purpose of the questions in the test was to describe an individual's role or level of involvement.

According to Nelson (2015:28), diagnostic tests were used when the problem was known, be it in the form of warning signs, proof, accusations or incidental circumstances. This suggested that an individual could have some involvement. Outcomes from such a polygraph examination were intended to have either a positive or negative diagnostic conclusion, which would determine the decision that would decide what further action should be taken.

2.4.5 Screening examination

Nelson (2015:28), Slupski (2015:3), Krapohl et al (2012:77) and the APA (2012:9) stated that screening tests were designed to investigate single or multiple types of behaviour. A screening test was used in circumstances where no problem or incident was reported, as it served as a deterrent, or was used to detect prohibited activities or to gather information.

For the purposes of this study, the spotlight was placed on diagnostic examinations, as the scope of the research focused on the polygraph as an investigative aid that was used in criminal investigations by investigators in the SAPS. SAPS polygraph examiners used the polygraph when there was a known allegation or incident and/or when there were reasons to suspect that a person could potentially be involved in an offence.

2.5 VALIDATED POLYGRAPH TECHNIQUES

As there are different types of polygraph examinations, there were also several validated polygraph techniques that could be decided on when conducting a polygraph examination. A polygraph technique comprised of a definite designed model for a test question sequence that included controlled and properly designed instructions regarding target selection and the compilation of questions, along with a properly designed model for test data analysis. Two tasks crucial for the success of any test were the collection of analytical information and the effective interpretation of the collected data (APA, 2012:6). Validated polygraph techniques were important. Techniques that were not supported by scientific evidence were not in the best interests of the client, discipline, public, or the future of the polygraph (APA, 2012:3).

APA bylaws (APA, 2014a:5) prescribed that a polygraph examiner who was a member of the APA should use validated testing techniques. If research for a technique was conducted within the realms of the APA research standards, the technique was deemed to be valid.

The APA bylaws (APA, 2014a:6) advocated that polygraph techniques for evidentiary examinations should have a minimum of two empirical studies. The replicated and original published research should exhibit the average accuracy level of 90 percent or more, which had to exclude the inconclusive rate not exceeding 20 percent. For paired testing, there should be a minimum of two published studies, original and duplicated, that demonstrated the average accuracy ratio of 86 percent or more. The inconclusive rate could also not exceed 20 percent. With investigative testing, the techniques used should have no less than two published studies, original and replicated. The studies should make evident an accuracy level of 80 percent or higher. As with all other validated techniques, the inconclusive rate could not exceed 20 percent.

Two published empirical studies, original and replicated, were also applicable for screening examinations. Unlike the other techniques, it only had to demonstrate accuracy rates that were considerably greater than coincidence. Additionally, when a screening test was not satisfactorily resolved, further testing with other validated methods had to be used (APA, 2014a:6).

A validated polygraph technique was selected for inclusion on the list of validated techniques if at least two or more published studies that supported it provided evidence that the studies were reliable and valid. A validated technique was recognised by way of publications which focused on the construction, structure and administration of the test question, sequence, and published reports of the procedures for test data analysis. Techniques were disqualified as a validated technique if at least two traceable published studies did not support their validity, or if the accuracy levels that were reported surpassed the requirements of the APA requirements (APA, 2014a:6).

Studies were also not included if statistical information of importance to the meta-analysis, which was a scientific and statistical examination of the findings of other scientific studies, were not provided. The purpose of the meta-analysis was to assist APA members, or any other interested individuals, with a reference document that enabled them to make knowledgeable choices regarding the availability and use of polygraph techniques. Finally, studies were also not considered in circumstances where testing processes did not abide to published accounts of a distinguishable polygraph technique or test data analysis method. Studies published in academic texts that were edited, reports that were financed and were supported by the US government, or peer reviewed scientific journals, were accepted (APA, 2012:3-4).

There were fourteen validated polygraph examination techniques. Every technique was specifically designed for a different purpose, which may be for investigative testing, evidentiary testing or paired testing. In broader terms, polygraph techniques were intended either for event-specific diagnostic testing or multi-issue screening. The most suitable technique should be identified based on the client's acceptance for errors. Some approaches were superior at deception detection, others in determining truthfulness, and some had a lower, inconclusive rate. It was thus imperative that the client's tolerance for error was matched with the elected polygraph technique, to ensure that the objective of the polygraph examination for the client was achieved (APA, 2012:7).

Some of the most commonly used validated polygraph techniques recognised by the APA were the following (APA, 2012:7):

- Air Force Modified General Question Technique
- Backster You-Phase Technique
- Concealed Information Test (CIT)
- Direct Lie Screening Test
- Federal You-Phase Technique
- Federal Zone Comparison Test
- Utah Zone Comparison Test (three-question)
- Zone Comparison Tests (ZCT)

The most popular, frequently used, and researched, validated techniques listed above (except for the CIT) were known as the Comparison Question Tests (CQT), which were predominantly used in criminal cases (Gougler, Nelson, Handler, Krapohl, Shaw & Bierman, 2011:203). As this research endeavour focused on the use of the polygraph as an investigative aid for investigators in the SAPS, a closer discussion of the CQT was relevant and pertinent.

2.5.1 The CQT

The underlying premise of the CQT was that the fear of detection of deception caused psychological stress. During a polygraph examination, the polygraph apparatus measured the fear of detection, and not deception per se (Bull, Baron, Gudjonsson, Hampson, Rippon & Vrij, 2004:10; Lissitzyn, 2008:288). The CQT test was designed in such a way that it posed a threat to the security of the subject, irrespective of their guilt or innocence. It was envisaged that a truthful individual would respond more to the comparison questions (Quality Polygraph Services, 2012:np). The comparison questions in a polygraph examination were not related directly to the offence. The focus of the comparison questions was on issues that related to an examinee's moral character. These questions, which were also known as 'probable-lie questions', were intended to be composed and tested in a way that negligibly prodded the examinee to answer 'no' (Synnott et al, 2015:67-68).

Comparison questions were general in nature and deliberately vague, in order to evoke arousal in an innocent subject. Comparison questions were formulated in a way that it posed a threat to the security of an innocent person. A person who was innocent

was forced to concentrate on the control questions and not on the relevant questions, as the control questions were designed in a way that forced the examinee to intentionally lie when answering these questions. An example of a control question would be 'Prior to 2018, did you ever steal anything?' (Elton, 2017:68; Lissitzyn, 2008:289; Bull et al, 2004:10).

Relevant questions were explicit questions regarding the offence. It was envisaged that a person who was being deceptive was more likely to respond to the relevant questions, which focused on the issue of the examination rather than on the control questions. An example of a relevant question would be, "Did you shoot that man?" (Elton, 2017:68; Lissitzyn, 2008:289; Bull et al, 2004:10).

In order for a polygraph examination to work effectively, deceptive and truthful subjects had to have the appropriate psychological set during the polygraph examination. A person who was innocent had to be afraid that the examiner would detect deception on the control questions. The reactions to the control questions emanating from the fear that an examiner would detect deception had to be stronger than those reactions to the relevant questions.

In contrast, deceptive people would be more concerned about having the offence and deception exposed by the relevant questions instead of by the control questions. Accordingly, a guilty person's physiological responses that were the result of fear of detection would be more obvious with regard to the relevant questions than to the control questions. The total measure of the physiological responses of an examinee to each question was inconsequential. A polygraph examiner evaluated the comparative strength of the reactions to the relevant and control questions, to determine truth or deception. The effectiveness of a polygraph examiner was recognised in how relevant and control questions that elicited the appropriate responses from honest and deceptive subjects were composed (Lissitzyn, 2008:289).

2.5.2 Limitations of the CQT

Synnott et al (2015:69) and Bull et al (2004:10) criticised the CQT for not being objective, and lacking standardisation. Bull et al (2004:10) went further by arguing that

it was ingenuous to believe that an innocent person would not be more roused when replying to any relevant question under the following circumstances, for example:

- Relevant questions evoked emotions – for instance, when a person who was innocent was a suspect in a murder, where the deceased was the spouse. Questions asked about the deceased in a polygraph examination could thus evoke memories and feelings.
- A person who was innocent could experience fear that the polygraph examiner would believe their honest answers.

Synnott et al (2015:70) pointed out that advocates of the CQT contested these criticisms by maintaining that comparison questions were formulated by an experienced and skilled polygraph examiner, to create an environment where innocent people were more concerned about the comparison questions and not about the relevant questions. Synnott et al (2015:70) further argued that the 2003 review by the National Research Council Committee (2003) determined that the minimum standards for review and the accuracy rate of the CQT were evaluated to be 85 percent, which was on par with the other studies. Consequently, from a research perspective, the benefits of the CQT went further than the accuracy rates, and the CQT did not essentially concern itself with disparagements of subjectivity or a flawed theory.

2.5.3 The CIT

In response to the collective denigrations of the CQT, Dr David Lykken introduced the CIT, which was not as frequently or widely used as the CQT. The CIT, unlike the CQT, was a “recognition test” and not a “detection test”. The purpose of the CIT was to detect whether a subject recognised a piece of information related to the offence as important, irrespective of assertions made to the contrary. To ensure the feasibility of the CIT in an investigation, only the police investigator would have the facts of the crime that only the suspect/s involved in the offence would possibly be in possession of, such as the type of weapon used in a murder case, that was not divulged to the media (Synnott et al, 2015:70-71; Krapohl et al, 2012:18; Bull et al, 2004:12).

A typical CIT examination, as with all other polygraph examinations, comprised the pre-test interview, the in-test, and the post-test. The imperative period of the CIT,

however, was the preparation for the polygraph examination that commenced prior to the pre-test interview. During the preparation stage, the questions for the in-test phase were formulated. Questions were designed in a multiple-choice format. The number of questions and probable answers for each question was determined by the available case facts. Every question on the test was relevant to a fact of the offence that only a subject who was present when the offence was committed, either as a suspect or a witness, would be likely to recollect. An example would be, 'What weapon was the victim murdered with?' One of the possible answers presented to the examinee would be correct (e.g. the actual murder weapon: a knife) while the remaining answers would be false, distinct but equally plausible, alternatives such as a handgun, a steel pipe, a rifle, or an axe (Synnott et al, 2015:70-71).

The CIT was of no value if an offence received significant attention in the media, an innocent suspect had attained information and details of the offence, or if investigators did not have ample information of the offence (Bradley, MacLaren & Carle, 2014:148). Critics of the CIT argued that this limitation made it exceedingly selective, and subsequently an unfeasible aid, frequently alluding to the FBI survey that was conducted in 1995 by Podlesney. The survey inferred that the CIT could only have been used in a meagre 13 percent of all cases. Advocates of the CIT contended that if a criminal investigation was done with the CIT in mind, as was the case in Japan, then it would certainly be used more frequently than other forensic investigative aids such as fingerprint analysis and DNA analysis (Synnott et al, 2015:72).

Reviews of CIT laboratory results by Furedy and Ben-Shakhar (1991) (as cited in Bradley et al, 2014:148) showed extraordinary levels when detecting guilty subjects and practically perfect protection for innocent people who were oblivious to the items that were relevant to the case facts. Additionally, according to Elaad and Ben-Shakhar (1989) (as cited in Bradley et al, 2014:148), field studies found that innocent people were protected; however, it was not found that there were high levels of accurate guilt classifications.

Despite there being different polygraph techniques, the APA (2012:7) maintained that the scientific evidence that was presently available was insufficient to proclaim that any one polygraph technique was better than the others. All polygraph techniques

followed the same phases – that was, the pre-test phase, in-test phase, data analysis phase and the post-test interview, which were imperative, in order to ensure that a polygraph examination was done according to APA standards.

2.6 PHASES OF A POLYGRAPH EXAMINATION

Woods (2015:66) emphasised that polygraph examiners had a responsibility to provide the best possible service, with integrity, by using the most reliable technology as well as available test formats. In order for a polygraph examiner to use the polygraph accurately and effectively, the phases of the polygraph examination, which consisted of the pre-test interview, the in-test phase, a diagnostic phase, and a post-test interview had to be conducted as prescribed by the APA. The significance of each phase would be discussed below, as conducting the polygraph test in the proper way ensured the accuracy and reduction of incorrect results.

2.6.1 Phase 1: Pre-test interview

Simply speaking, an interview was a conversation with a purpose. The success of the conversation was dependent, in part, on the ability of the interviewer to obtain information. It was envisaged that, during an interview, a person would disclose information that was valuable to an attentive and interested listener who had built rapport using conversation and interview questions (Nelson, 2015:29).

Kleiner (2002:14) described a pre-test interview as a low-key approach that was designed to subtly obtain information from an examinee, without exerting pressure or confrontation. It was considered to be an investigative psychological interview, and not an interrogation. It was not the intention of the polygraph examiner to criticise or challenge the examinee's events. The function of a polygraph pre-test interview was therefore to habituate a truthful person to the cognitive and emotional impact of hearing and responding to the questions on the test that described their likely involvement in an offence. It also sensitised or increased the awareness and responses of prospective untruthful individuals to the questions that described their past behaviour and actions (Nelson, 2015:29).

The pre-test interview orientated an individual subjected to the polygraph examination, to the testing process and procedures of the polygraph examination. The pre-test interview was considered the foundation of the examination whereby a subject was psychologically prepared for the test. In the pre-test interview, the examinee was introduced to the polygraph equipment and sensors, the questions, the answers (either 'yes' or 'no'), and the specifics of the test. The examinee was also afforded the opportunity to become familiarised with the test procedures, so that nothing that happened during the test would be unexpected. Contingent to how complex a case was, the pre-test interview could last from half an hour to over two hours, to ensure that the examinee was clear about the test issues and what each response should be.

The polygraph examiner had to be in a position to determine the best type of test structure to be used during the polygraph examination. Examination structures differed in length, depending on the type of examination as well as the number and type of questions that were asked. The Quality Polygraph Services (2012:7) emphasised that the pre-test phase was notably the most crucial part of a polygraph examination, as it was a very structured interview that established the groundwork of the process. A fundamental aim of a pre-test interview was for the polygraph examiner to prepare the subject psychologically for the in-test phase of the test. During a pre-test, the examinee was put at ease as the examiner established and maintained rapport, verbal and nonverbal signals of the examinee were observed, compassion expressed, the subject's insight was evaluated, and the examiner showed expertise and established authority.

The vast majority of polygraph examiners were not medical practitioners, psychiatrists or psychologists, but the training that they received during the basic polygraph course was designed to enable them to make an effective assessment regarding the suitability of a person to be subjected to a polygraph examination, based on the APA model policy for examinee suitability (APA, 2012). The purpose of this policy was to assist polygraph examiners in making informed decisions regarding the suitability of prospective subjects who were going to submit to a polygraph examination. Policies that were developed and were in place regarding examinee suitability assessments, were important and relevant. This was to protect examinees from submitting to polygraph examinations that were detrimental to themselves or their communities, and

to circumvent the costs of resources for examinations that did not contribute to the objectives of an investigation, the screening of applicants, risk assessments or the management of risks (APA, 2012:205).

According to the APA (2012: 205-206), polygraph examinations would not be conducted under the following circumstances:

- The subject was deemed to be mentally or physically exhausted.
- The subject was unduly emotional, intoxicated, or had used sedatives, stimulants or tranquillisers.
- The subject was identified as being addicted to narcotics.
- The subject was diagnosed by a psychologist or psychiatrist, with a known mental disorder.
- The subject was feeling physical discomfort or seemed to possess significant physical disabilities or defects which could cause an abnormal response during the polygraph examination.
- The subject was experiencing psychosis such as a lack of contact with reality, hallucinations or delusion.
- The subject exhibited a Mean Age Equivalence or Standard Age Score below that of a 12-year-old child as determined through a psychometric test.
- It was determined that the subject had a DSM Axis V Global Assessment of Functioning score of 50 or less.

Polygraph tests should be conducted by professional and ethical polygraph examiners in a way that was sensitive to any health, psychological, emotional or developmental issues that could likely effect the way in which the individual functions and/or on the quality of the data from the examination (APA, 2012:207).

2.6.2 Phase 2: In-test data collection

The in-test data collection phase was the second part of a polygraph test. This was done using any one of the validated polygraph test techniques (Nelson, 2015:32). During the in-test phase, the sensors described earlier were attached to the examinee, and the data was collected when the subject was asked a number of reviewed

questions, while charts recorded the subject's physiological responses to the reviewed questions (Tarase et al, (2013:7).

Once data collection was completed, the polygraph examiner scrutinised the data generated from the physiological responses of the examinee, in order to make a determination as to the questions to which the examinee may have been deceptive. Examinees responded differently during deception. Some may respond with changes in vascular pressure, while others could react with changes in the heart rate. In order to determine deception or no deception, at least three physiological characteristics had to be present to make an informed decision. For there to be deception indicated, the responses from certain questions had to be consistently observed, the responses to those questions observed had to be specific, and the responses had to be significantly different from the baseline response (Tarase et al, 2013:8).

2.6.3 Phase 3: Data analysis

Prior to informing the examinee, or any other relevant persons, of the outcome of the polygraph examination, the data generated during the in-test phase had to be analysed and verified by the polygraph examiner. Procedures for the analysis of the data were designed to partition and compare the sources of the response variance. Responses were coded numerically. Final results were compared to cut-scores that represented normative expectations for truthful or deceptive people (Nelson, 2015:33). Nelson (2015:34) asserted that the analysis of data collected during a polygraph test was evaluated based on a similar approach to other scientific tests, be it medicine, psychology or forensics. For the generated data to be effectively analysed, it had to be observable or measurable. The raw data generated had to be converted into arithmetical values. The converted numerical values had to adhere to the polygraph technique scoring criteria to obtain a combined total for the entire examination and the subtotal indices for specific examination items.

In the SAPS, all data generated during the in-test phase was analysed and verified by an independent polygraph examiner who was not involved in the polygraph examination. This was to guard against biasness of the polygraph examiner.

2.6.4 Phase 4: Post-test interview

A post-test interview followed the in-test phase and the subsequent analysis of the data collected during the in-test phase. The outcome of the data that was analysed determined whether a post-test interview would be conducted. Even though the test results could indicate deception, there could be other factors that could have contributed to a 'deceptive' result; therefore, the ethical guidelines of the APA (2012:7) prescribed that the examinee had to be allowed an opportunity to explain the results of the examination, and to discuss any issues that could have caused the result.

In order for a polygraph examination to be conducted optimally, the most appropriate type of test and technique should be determined by the polygraph examiner for the best result. It was also vital that the proper test procedures were followed, and adhered to the identified purpose for conducting the polygraph examination (APA, 2019:np).

2.7 THE PURPOSE OF THE POLYGRAPH

Polygraph techniques that were in use today differed radically from coercive methods such as torture – be it mental, physical or psychological. The polygraph can only be used on subjects who were ostensibly cooperative, as resistant subjects could always disrupt a test if so inclined. The physical discomfort that an examinee could experience during a polygraph examination was minuscule compared to the pain and torture that suspects and prisoners sometimes had to endure during an intense interrogation. Although it could be argued that the practice of lie detection followed the logic of torture, it was not torture – not even psychological torture (Alder, 2007:261).

The fundamental purpose of a polygraph examination was to establish whether a person was being deceptive or not. Admissions and confessions obtained in the process were considered an added bonus. Polygraph testing further enhanced the ability to obtain enhanced and more detailed information. When used in the approved manner, polygraph examinations could be more effective than any other aid that was currently being used to determine deception. It also showed who had or did not have information for an investigator to obtain or follow (Nelson & Handler, 2014:25).

According to Nelson (2015:28), polygraph examinations were divided into two main categories: diagnostic testing and screening tests. The basis of diagnostic tests was to arrive at a result that could help determine what further action was needed. The action required could have an effect on an individual in terms of their liberties and rights – such as an arrest or the loss of a job. Screening tests, on the other hand, were conducted to augment validity to risk management decisions in the absence of any identified problem. This was achieved by means of collecting information and probing any likely involvement of a person in one or more issues of concern. Screening tests also served as a deterrent by preventing people who were deemed to be high-risk from being conscripted to environments that were considered high-risk – such as law enforcement, government and intelligence agencies. It could assist in decreasing non-compliance with policies, rules and regulations within organisations.

Honts (2004:103) purported that polygraph examinations were used for a number of reasons. In some US jurisdictions and in Japan, polygraph results were admissible in court proceedings. In many countries, law enforcement agencies used the polygraph as an aid in investigations to determine the truthfulness of suspects and informants. It was also used as a pre-employment screening tool to verify integrity in the applicant selection process. In recent times, in the US and some European countries, the use of the polygraph had gained momentum in sex offender programmes. In the US, as part of offender release programmes for sex offenders, it was mandatory for sex offenders to submit to and pass polygraph tests from time to time, relating to new sex offences or other illegal activities. In such circumstances, the polygraph was referred to as a preventative measure and a treatment tool.

The exact extent regarding the usage of polygraph worldwide was not known, but law enforcement agencies in South Africa, as in many countries abroad, advocated the polygraph as an investigative tool. It was by no means a replacement for customary investigative techniques. The chief of the Polygraph Unit in the FBI Laboratory wrote that the FBI used the polygraph as an investigative technique, which was considered to be decidedly reliable when used by well-trained and ethical polygraph examiners (Murphy, 1996:1-2).

When the polygraph was used appropriately, it had the potential to serve as a deterrent, could identify individuals withholding valuable information, clear innocent people, and, in the hands of a skilful interrogator, could elicit confessions and admissions of guilt. In the absence of independent corroboration, the results of a polygraph examination should be viewed cautiously, and not be relied upon to the exclusion of other evidence. While some areas affected validity and reliability, as research showed, the polygraph technique, when used correctly and appropriately, was often accurate. False positives or false negatives which occasionally occurred, generally transpired when polygraph examiners deviated from established testing standards (Murphy, 1996:1-2). A false positive was when an examinee gave an answer which was not deceptive, but the polygraph examiner identified the answer as deceptive. It could be deduced that a false positive result ensued when an examinee who was truthful, was classified and communicated as a deceptive result. False negatives, conversely, were classified when an examinee who was deceptive, was reported as being truthful. (Krapohl et al, 2012:35; Lissitzyn, 2008:294).

According to Van Aperen (2016:np), law enforcement communities used the polygraph as an investigative tool to do the following:

- Authenticate reports made by victims.
- Determine the integrity of witnesses.
- Assess the truthfulness of a suspect.
- Assist in absolving a person who was innocent but was encircled by evidence that was either circumstantial and/or unfounded.
- Obtain new information that was not previously known or disclosed.

Sosnowski (2008a:np) pointed out that when polygraph was used appropriately as an investigative tool, it could exclude falsely accused persons and identify the guilty, thus providing the investigator with a more efficient and productive use of their time. Worldwide, including in South Africa, the use of the polygraph had yielded positive results in doing the following:

- Excluding innocent people as suspects
- Identifying fabricated complaints
- Testing informers to determine the authenticity of information provided for monetary rewards or a benefit

- Providing new information to a probe when customary investigatory methods had failed to yield positive results
- Tapering the direction of the investigation
- Collecting supplementary facts and proof
- Guiding an investigation to specific suspects
- Locating crucial evidence such as weapons or exhibits in an ongoing investigation
- Preventing unjust accusations
- Upholding honesty
- Detecting and exposing criminals
- Seeking and verifying the truth in criminal matters
- Limiting corruption
- Determining the credibility of witnesses/victims/informants complainants

Tarase et al (2013:8) added that polygraph examinations in criminal cases could also do the following:

- Uncover detection.
- Coax guilty people into making admissions.
- Differentiate between innocent and guilty people.
- Be a substitute for unlawful and sometimes potentially extreme interrogation methods.

Finally, Krapohl (2015:66) maintained that polygraph examiners were generally drawn into cases for the following reasons:

- When an investigation had stalled, investigators resorted to using the polygraph when there were insufficient evidence to identify which person could be the suspect.
- Investigators did not have sufficient evidence against a person, but believed that they had the suspect, and are looking for a confession.
- Sometimes investigators had all the evidence needed for a conviction, but merely wanted a confession.

The polygraph was used in an assortment of settings and for a variety of purposes in many countries. In spite of the extensive use of polygraph in the US, the precise extent

of the use of polygraph worldwide was not known, although polygraph examinations undoubtedly played a vital part in the law enforcement sector (Honts, 2004:103).

2.8 POLYGRAPH UTILISATION: AN INTERNATIONAL PERSPECTIVE

During 2012/2013, police organisations in European countries discussed whether polygraph examinations were needed in criminal investigations. While there were those who found polygraph examinations useless and outdated (Aleksandras & Saldžinas, 2014:12), the outcomes of polygraph tests were generally recognised in the US and Japanese court systems (Elton, 2017:72; Matte, 1996:22). Additionally, polygraph tests were used by law enforcement in many countries, such as China, Russia, Israel, Romania, Columbia, Mexico, Taiwan, Russia, Poland and Turkey, among others (Honts, 2004:104).

2.8.1 Belgium

During the 1990s, the police in Belgium initiated the use of the polygraph when they accumulated a considerable number of unsolved criminal investigations. To overcome the impasse in the investigations, Belgian investigators resorted to submitting the possible suspects for polygraph examinations. Experienced polygraph examiners from South Africa and Canada were requested to test Flemish and Wallonian suspects respectively. The introduction of the polygraph in Belgium turned out to be a success, although it was not necessarily attributed to the cases being solved, but because some of the suspects confessed during or after the tests. Emanating from these successes, the Belgium Federal Police in Brussels trained their own members as polygraph examiners. Presently, dedicated polygraph examiners conducted about 300 polygraph examinations annually (Meijer & Van Koppen, 2008:231-232).

2.8.2 Netherlands and the United Kingdom

In the Netherlands and the United Kingdom (UK), polygraph examinations were neither used in police investigations nor as evidence in a court of law. On 18 June, 2004, in LJN AU 5496, the Dutch Supreme Court unanimously rejected polygraph evidence by arguing that “the use of polygraphs in criminal investigations is disputed

because of its unreliability” (Meijer & Van Koppen, 2008:233). There had also been a number of attempts to use the polygraph in criminal cases in the UK, but in 2004, a report by the British Psychological Society concluded that “the use of polygraph has inherent weaknesses and that the error rates can be high” (Meijer & Van Koppen, 2008:233). Freckelton and Selby (2005) (as cited in Kapardis, 2010:281) also concurred that no rulings had been reported regarding the application of the polygraph by a High Court in the UK.

2.8.3 Germany

The polygraph was generally used in Germany in civil cases, especially in child custody disputes where there were reported allegations of sexual abuse. The use of the polygraph was not allowed in criminal cases, after the German Supreme Court revoked the use of the CQT from procedure in 1988 (Canter & Žukauskien, 2008:233).

2.8.4 Finland

The polygraph was in use by the Finnish National Bureau of Investigation since 1995. Polygraph examinations were conducted, predominantly in homicide and sexual crime cases. The CIT technique was also used in murder cases, to divulge the places where the deceased were hidden (Canter & Žukauskien, 2008:232).

2.8.5 Norway

The Supreme Court in 1996 rejected polygraph evidence; however, similar evidence was later accepted by the Appellate Court. Presently, in Norway, the polygraph was used by the police in the pre-trial phase, with the courts treating such evidence in different ways (Canter & Žukauskien, 2008:233).

2.8.6 Switzerland

In Switzerland, the polygraph was considered an unlawful means of investigation. It was ruled by the Swiss court that the use of polygraph examinations violated the European Convention on Human Rights, Article 6 (Canter & Žukauskien, 2008:234).

2.8.7 Israel

The polygraph was first introduced in Israel in 1957. Within a few years, the polygraph became a significant investigative aid and was used by government, private, and law enforcement examiners who conducted thousands of specific and security tests every year (Amsel, 2015:47). Dr Avital Ginton and Professor Eitan Elaad from the National Israeli Police Polygraph Laboratory published many research papers relating to the polygraph. Research into the polygraph was not limited to the National Israeli Police Polygraph Laboratory, as local researchers from the Hebrew University in Jerusalem, Dr Kugelmass, Lieblich, and Ben Shakhar also contributed significantly to polygraph research (Amsel, 2015:47).

While most European countries were cautious about using the polygraph, there were many countries where the polygraph was used in criminal investigations as well as in court evidence.

2.8.8 Japan

Japanese law made provision for the police to have more control over a crime scene than in many other countries. This enabled the Japanese police to protect critical investigative information from the media and suspects. This provision assisted and enabled Japanese polygraph examiners to use the CIT technique in a considerably greater number of cases. Since the World War II, the use of the polygraph in Japan had grown tremendously, to the extent that there were more than 100 practising forensic polygraph examiners. According to Synnott et al (2015:70) and Barland (1995) (as cited in Matte, 1996:24), results emanating from polygraph examinations were frequently allowed as evidence in Japanese legal proceedings.

Synnott et al (2015:70) stated that since the 1980s, the CIT was used widely by the National Police Agency to test more than 5000 suspects annually. The polygraph examinations were conducted by specially trained experts who were not police investigators, but researchers employed by a forensic laboratory. The polygraph examiners were not involved in cases, but if needed, or requested, they visited the crime scene in order to formulate test questions.

2.8.9 Columbia

There were no specific references as to when the use of polygraph was introduced in Columbia, but by 1996 certain agencies used polygraph examinations that had been typically administered by foreign polygraph examiners. As in many environments, the use of the polygraph in Columbia had many challenges. Just as in the South African context, there was no definite decree that authorised and legalised the use of the polygraph in Columbia. By way of the polygraph profession, some polygraph examiners who conducted polygraph examinations without proper training and/or necessary qualifications, offered their services at considerably lower prices. Consequently, such tests were often of an inferior quality. This, in turn, generated distrust in the reliability of polygraph examination results. Furthermore, the lack of interest of most polygraph examiners in continued education and advanced courses affected the quality of polygraph examinations. The co-existence of two polygraph professional associations further generated division and jealousy among practising examiners (Bermudez & Arias, 2011:129).

2.8.10 Singapore

The polygraph was introduced in Singapore in the mid-1970s, and polygraph examiners in the Singapore Police Force (SPF) conducted polygraph examinations solely for criminal or specific issues. There were no laws in Singapore that governed the use of the polygraph or its results. Neither polygraph examiners in the government sector nor in private service needed to be licensed, as the results of polygraph examinations were used solely as an aid to investigations and decision-making, and not as evidence in court. The SPF used the polygraph exclusively to assist and guide investigations, and examination results were not used in court proceedings. Polygraph examinations were considered as a forensic interviewing method, and the rules of interviewing of witnesses and suspects as detailed in the local laws, were applicable to such examinations (Ngoo, 2009:292-293).

2.8.11 South Korea

The first polygraph examination by a South Korean examiner was conducted in 1961. In South Korea there were no private polygraph examiners, as all examiners were employed by the Military or as law enforcement officials (Matte, 1996:54). Polygraph examinations were used exclusively in criminal and traffic accident cases. Lee (2010:20) argued that the area of detecting deception had not received sufficient attention by academia in South Korea. Academic articles relating to polygraph examinations were mostly about legal concerns regarding the admissibility of polygraph evidence in court proceedings.

Scientific experimental research on polygraph testing was never carried out in South Korea; however, a couple of articles using a correlational approach were published. Academics in South Korea attempted to evaluate the accuracy of polygraph examinations by using the outcome of a prosecutor's decision as ground truth. Several descriptive analyses of polygraph results in conjunction with criminal case categories, were published. These studies were however, not supported by the government. Overall, the lack of scientific research was a fundamental problem for the South Korean polygraph community. South Korea also did not have licensing laws to regulate examiners, or laws that restricted the work of polygraph examiners (Lee, 2010:16).

As can be seen, there were some countries where polygraph was shunned, whereas in some other countries, while not used as evidence in court proceedings, it played a decisive role as an investigative aid in investigations. In South Africa, although the polygraph was still considered a relative novelty, at the 2012 Annual American Polygraph Seminar Luncheon for international delegates in San Diego, South Africa was singled out as a country with the fastest growing market in the use of the polygraph.

2.9 POLYGRAPH IN SOUTH AFRICA

Scheithauer and Kalula (2008:109) stated that the first known recorded use of the polygraph in South Africa dated back to 1978, when a clinical psychologist who trained as a polygraph examiner in 1977 in the US, conducted polygraph examinations for a

private security company in Johannesburg. During 1985, members from the National Intelligence Service were trained in polygraph testing at the Polygraph Institute of Israel, because of the sanctions against South Africa by the US. During the 1980s, while there were polygraph examiners in private practice, Military Intelligence and National Intelligence were the only government agencies with designated polygraph capacities (Matte, 1996:66-67).

In the late 1980s, an electronics engineer developed a computerised polygraph instrument, but the project was unsuccessful because polygraph examiners wanted immediate online printing of charts, the printer was too loud, the printing was not continuous, the tracings were shown in bursts, and the full development would have been too costly. When the polygraph was initially introduced in South Africa, serious mistakes were made by polygraph examiners which had an adverse impact on potential clients and users, due to the fact that many polygraph examiners were predominantly focused on acquiring confessions to the detriment of innocent people (Matte, 1996:66-67).

As in many other countries, South Africa did not have any legislation or regulations regarding the polygraph, although it was used extensively in private practice and law enforcement. Cilliers and Martin (2002:136-137) alluded to the fact that the application of the polygraph in the private industry was not only extensive and widespread, but also on the increase. Blignaut (1998:7) reported that the increase in the usage of the polygraph in private companies in South Africa was ascribed to the increased requests from the private sector, who used the polygraph in pre-employment selection processes and in internal criminal investigations. South African polygraph examiners in private practice were under no obligation to be affiliated to any organisation or association; however, SAPS polygraph examiners were expected to be affiliated to the APA.

2.10 POLYGRAPH IN THE SAPS

In 1995, the National Commissioner of the SAPS, General George Fivas, took the initiative to undergo a polygraph examination. This gesture made the public aware of polygraph as an aid in transparency and in the screening of senior managers

(Claasens, 1997:7). It also impressed upon IOs that they should take cognisance of the value of polygraph as a tool in criminal investigations; thereafter, there was an increase in requests for polygraph examinations from IOs.

The SAPS did not initially have a designated polygraph capacity and used the services of private polygraph companies. It was considered a short-term solution for the increasing demand for polygraph tests, which started to become an expensive venture. Subsequently an investigation into the feasibility of establishing capacity within the SAPS was explored and in 1996, approval for a feasibility study was granted (Claasens, 1997:9).

To ensure independence of an investigative support capability, the polygraph unit fell within the ambit of the Forensic Science Laboratory, and would initially be a centralised service on a national basis for criminal investigation purposes to IOs countrywide (SAPS, 1997:np). In May 1997, the National Commissioner of the SAPS gave approval for 10 SAPS members to be trained as polygraph examiners. From January to March 1998, the first polygraph course in South African took place in Pretoria, consisting of 10 SAPS members and 10 SANDF members. A polygraph capacity was consequently established within the organisation. Polygraph examiners in the SAPS were mandated to conduct polygraph examinations in three environments, namely criminal investigations, vetting, and integrity management (SAPS, 1998:np).

In South Africa, be it in academia or the law enforcement environment, no specific research initiatives were ever presented. From time to time, postgraduate students have focused their dissertations on the polygraph, but no research at the level compiled by the APA, researchers, or government agencies in the US were undertaken. This study had found that within the law enforcement community, there were no/limited contact among polygraph examiners. Furthermore, there were no symposia or forums bringing polygraph examiners, researchers, academics, government agencies and the law enforcement communities together to present papers, share experiences or best practices, or initiate legislation in South Africa – unlike in other countries.

The polygraph has been in use for decades in the private sector and law enforcement communities globally, and as a result, there was a considerable amount of international information and studies in the published literature. The research published usually presented valuable data, but sometimes, to a lay person, it could come across as being somewhat boisterous.

2.11 RESEARCH IN POLYGRAPH

There were several international research and case studies in polygraph literature regarding the accuracy of polygraph examinations, but Vrij (2007:317) asserted that much of the literature did not give genuine insight into the accuracy of the polygraph. It was for this reason that in order to understand how accurate the polygraph was, that the vast amount of research presented was based on findings that emanated from either field studies or laboratory studies.

2.11.1 Laboratory studies

Nelson (2015:69-72) asserted that laboratory studies were not exclusive to the polygraph fraternity, as it was common in all scientific studies. The advantage of laboratory research was that random assignment to experimental and control groups could be achieved. This was significant, as it increased the reliability and generalisability of a study's results, which was not always achievable. Where it concerned the polygraph, laboratory studies were mock scenarios which were conducted in a controlled environment where the examinee was aware that it was a simulated exercise. The results were therefore not necessarily reliable or generalisable (Krapohl et al, 2012:50).

2.11.2 Field studies

Farrell (2016:np) defined field studies as research that was conducted in the user's environment, instead of the laboratory, with the objective to gather information, understand people's needs, or to test systems under realistic conditions. It could be stated that field studies were important, because they helped answer scientific questions regarding the generalisation of scientific results that were observed in a

controlled laboratory environment. Within the polygraph environment, field studies were beneficial because they could be understood to have natural validity, in that the study conditions were identical to field testing conditions. Nelson (2015:69-72) purported that field polygraph studies that significantly outperformed the results of laboratory studies should be carefully evaluated before the results were accepted.

In the study by Patrick and Iacono (1991:632), the effectiveness of field and laboratory polygraph examinations were compared, in order to identify innocent and guilty people who were tested using the CQT. Polygraph tests were conducted on 48 prisoners in a simulated theft scenario. Their physiological reactions were recorded simultaneously in field and laboratory settings. Emanating from the study, it was determined that the results from the field and the laboratory were, in essence, similar. A comprehensive analysis emphasised that errors which transpired were typically a result of the failure of the existing processes to distinguish between control and relevant questions for truthful subjects. The findings indicated that the CQT was predisposed to false positive errors when people were polygraphed in conditions similar to the field.

Honts (1994:np) reported, in a field study of the Canadian Police College Polygraph Technique, that data was assessed in 41 field cases. In 32 of the cases, results that were based on the analysis of the polygraph charts were revealed to exceed 91 percent. The Canadian Police Polygraph Technique was concluded to be exceedingly valid in distinguishing truth-tellers from the deceivers.

Pollina, Dollins, Senter, Krapohl and Ryan (2004:1099-1105) conducted a comparison of laboratory and field research, and then compared the findings of both studies. The laboratory study was a mock crime scene where guilty subjects were instructed to steal a piece of jewellery that had been hidden. The innocent subjects were also tested about the crime. Fifty-five subjects who participated in the study were paid a fee for their participation. Furthermore, any subject who passed the test as innocent or guilty was paid a bonus. The polygraph tests were conducted by four certified DoDPI polygraph examiners.

In the field study, the polygraph charts of 67 suspects in criminal cases were evaluated and analysed. It was determined that 39 examinees were confirmed deceptive, while

28 were identified to be non-deceptive. The subjects confirmed that the results were based on confessions as well as physical evidence, and not the polygraph tests. The tests were conducted by certified polygraph examiners from different law enforcement agencies and submitted to DoDPs database for analysis.

The data collected from both the laboratory and field studies, respectively, revealed the following:

- The physiological responses from the subjects in the field study were significantly more intense than those in the laboratory study.
- The rate of accuracy for the laboratory studies and field studies were similar, where the difference in accuracy was mostly due to false positives, and where the false positive rate of field decisions was thrice as high as in the laboratory.

This study did not concur with the sentiment that field studies were more accurate than laboratory studies.

2.11.3 Accuracy of the polygraph

It was no secret that polygraph testing was a controversial and often misunderstood subject. A crucial issue that critics and sceptics alike had against the polygraph, was that it was not 100% accurate. In fact, no research was able to show that the polygraph was 100% accurate. Cognisance should, however, be taken of the fact that no scientific technique when dealing with people was 100% accurate, including psychiatry and psychological evaluations, Deoxyribonucleic Acid (DNA) analysis, fingerprint analysis, handwriting analysis, or eye witness testimony (Amsel, 2013:26-29).

Vicianova (2015:525) and the National Research Council (2003:4) stated that as a result of the increasing prominence and persistent erroneous findings, the test to determine reliability was conducted on the polygraph. Emanating from research, it was found that the reliability of the polygraph was between 81 and 91 percent. Vicianova (2015:525) added that studies conducted and presented by Ginton (2013), Lewis and Cuppari (2009), Grubin (2008), Grubin and Madsen (2005), Bartol and Bartol (2004) and Fiedler, Schmid and Stahl (2002) supported the findings from the National Research Council (2003).

According to Gordon and Fleisher (2011:313), emanating from research conducted and published by the APA, in 2174 field polygraph examinations, the following were found:

- In 12 studies pertaining to the validity of examinations conducted in the field, an average accuracy rate of 98 percent was evident.
- In 11 studies regarding reliability, the analysis of 1609 charts from field examinations revealed the average accuracy rate to be that of 92 percent.
- From 41 studies emanating from 1787 mock polygraph tests in laboratory settings, the average accuracy was found to be 80 percent.
- In 16 studies that related to reliability, in an analysis of 810 charts collected during laboratory mock tests, an average accuracy rate of 81 percent was exhibited.

Nelson and Handler (2015:93) added that the scientific reviews since 1973, although estimated high in the past, seemed to have converged over time with studies from within and outside the polygraph environment. Grubin (2010:447) in fact stressed that there were several studies regarding the accuracy of the polygraph, which included laboratory and field studies. Some studies reported an accuracy rate ranging from around 50 percent to almost perfect accuracy rates. A comprehensive and significant appraisal of the research literature that was spearheaded by the National Research Council (2003:4), concluded the accuracy rate for polygraph to be in the range of 81 to 91 percent. The research by the National Research Council (2003) further concluded that the 10 to 20 percent error rate identified was very high.

The debate around the accuracy of the polygraph was further complicated by the fact that there was an assortment of polygraph examinations exhibiting different accuracy rates. Tests that focused on a single or specific issue, and concealed information tests that were used in criminal investigations, were found to have better and higher accuracy levels, unlike multi-issue tests which were commonly used in screening and vetting processes (Grubin, 2010:448).

Amsel (2013:25-36, 45-57) presented a study where latent fingerprints, DNA analysis, ballistics and medicine were unable to produce 100 percent accuracy rates, but were considered instrumental when presented as evidence during court proceedings. Matte (2000:168) and Amsel (2013:53) also referred to a study by Widacki and Horvath

(1978) in a laboratory setting where the validity and effectiveness of the polygraph was compared to other common techniques of investigation. The study compared the polygraph with fingerprint analysis, handwriting analysis and eyewitness evidence, which were accepted as expert evidence in legal proceedings, although they did not boast 100 percent accuracy without the possibility of false positives. A summary of the study is herewith presented in Table 2.1 and Table 2.2, as follows:

Table 2.1: Comparison of polygraph results to handwriting analysis, eyewitness evidence and fingerprint analysis.

Investigative Aid	Decision		
	Correct results	Incorrect results	Inconclusive
Polygraph	18	1	1
Handwriting analysis	17	1	2
Eyewitness evidence	7	4	9
Fingerprint analysis	4	0	16

Table 2.1 reflects the distribution of case decisions made in each investigative aid Amsel (2013:53) and Matte (2000:168).

Table 2.2: Comparison of polygraph results to handwriting analysis, eyewitness evidence and fingerprint analysis based on the number of correct final decisions and false positive errors made.

Identification method	Number of correct decisions made	% of false positive errors
Polygraph	78	1.3
Fingerprint	16	0
Handwriting	72	1.4
Eyewitness evidence	44	9.1

The study by Widacki and Horvath (1978) (as cited in Amsel, 2013:53 and Matte, 2000:168) implied that the polygraph examiner solved 95 percent of the cases, the handwriting expert solved 94 percent of the cases, eyewitness evidence solved 64 percent of the cases and the fingerprint expert solved 100 percent of the cases. When inconclusive results were taken into account, the percentage of correctly solved cases changed to 90 percent for the polygraph, 85 percent for handwriting analysis, 35 percent for eyewitness testimony, and 20 percent for fingerprint analysis. The greatest number of inconclusives (16) was from fingerprint identification, and the greatest number of false positives was the eyewitness identification at 9.1 percent, followed by handwriting at 1.4 percent, and polygraph at 1.3 percent.

Kassin, Dror and Kukucka (2013:42-52) pointed out that, in wrongful convictions, 38 percent were due to unreliable and incorrect serology evidence, and 22 percent to inconsistent hair comparison evidence. Gross, Possley and Stephens (2017:2) concurred that in various types of false or misleading evidence, such as eyewitness misidentification, it was false confessions and bad forensic science that had contributed to wrongful convictions in the US. This highlights that accuracy rates in the various scientific disciplines, even though admissible in legal proceedings, were also subject to inaccuracies and erroneous results.

Amsel (2013:55-56) reiterated the adeptness of the polygraph as an investigative aid, which was demonstrated in a study by Light and Schwartz in 1993. One thousand and

sixty-nine forensic examinations (1069) by the US Army CID, from 1990, were analysed using eight primary forensic disciplines in support of the investigations. Of the forensic examinations, 584 (55%) were traditional laboratory disciplines, namely latent fingerprints, questioned documents, illicit narcotic analysis, ballistics, trace evidence, serology and photography, combined, and 485 (45%) were with the polygraph. The polygraph gave the investigators 432 (89%) results that had positive results, while the other fields culminated in 431 (74%) of positive results. The study further concluded that the polygraph was the most frequently used and effective of all the disciplines.

This finding was partly due to the fact that the polygraph examinations could be conducted anywhere, as there was no need for an expensive laboratory setting – unlike DNA and fingerprints, which disqualified samples/exhibits for various reasons if the conditions were not conducive or a result could not be obtained. Virtually none of the results were disqualified by the polygraph, because inconclusive tests could be solved by re-testing. Finally, 69 percent of the examinees in the study were found to be truthful, emphasising that the polygraph helped innocent people to prove their innocence.

Further studies by Bersh (1969:399-403) found that the decisions made in criminal investigations that were conducted by the polygraph examiners in military services exhibited an accuracy rate of 92.4 percent when corroborated against guilt-innocence verdicts that had been made by Judge Advocate General lawyers.

Honts (1996:309-324) examined polygraph data from 41 criminal case files. His findings concurred that the decisions by the initial examiners were correct 96 percent of the time. It was further determined that cases assessed from police records for 402 CQTs that had been conducted by police polygraph examiners over a period of five years in a Canadian city, had a 98 percent success rate for identifying guilty subjects.

2.11.4 Error rate

There was a great deal of controversy regarding the error rate in polygraph testing. The error rate was the extent to which an examinee provided an answer that was not

deceptive and the polygraph examiner identified it incorrectly. Errors in polygraph tests could be the result a polygraph examiner failing to prepare the examinee properly for the polygraph test, or else the physical data on the polygraph charts was misread or misinterpreted. Lissitzyn (2008:295) argued that there was no general agreement as to what the error rate was, and posited that accuracy rates were quoted between 60 and 85 percent, while the APA and researchers from the polygraph community cited figures for accuracy rates to be 80 percent and above.

Reasons for disparities in error rates may be because of the statistical base that was used or the method of conducting the studies. According to the APA, some statisticians identified an 'inconclusive' response as an incorrect decision, inflating the error rate. The APA explained that if 10 polygraph tests were conducted, and the examiner was right in 7 cases, erroneous in 1, and there were 2 inconclusive results, then the accuracy rate was 87.5 percent. Polygraph critics would argue that the accuracy rate in the above scenario was 70 percent, that is, 10 examinations with 7 correct decisions. Most polygraph examiners and proponents of the polygraph did not perceive inconclusive test results negatively, and did not hold them against the polygraph examiner.

Error rates can have serious repercussions, as presented by Dutton (2015:np) at the APA Seminar in 2015, regarding instances where the polygraph examination did not work. In a serial killing case in the US, Gary Ridgeway, the Green River Killer in Kings County, Washington State, strangled, raped and killed his victims. He was one of many suspects who had been polygraphed on 7 May 1984, but he passed the polygraph examination. In 2001, DNA evidence connected him to four murders, and in 2004 he pleaded guilty to 48 murders and was sentenced to life imprisonment without parole. Had the suspect been correctly identified by the polygraph in 1984, many innocent lives could most probably have been saved.

The most notable case where the polygraph failed in South Africa, was during 2008 in the Sheldean Human murder case in Pretoria, where the accused, her neighbour, passed the polygraph examination. Later he was arrested and confessed to the crime. He was found guilty of the kidnapping, rape and murder of the young girl, and sentenced to life in imprisonment (Hosken, 2012:np). Rheeder (2012:17) pointed out

that the accused in the case had passed the polygraph examination because of his low IQ, which resulted in him not understanding the test and the consequences thereof.

Due to the fact that any error could have serious repercussions, polygraph examiners had at their disposal a variety of procedures that could help identify factors which cause false results (Lissitzyn, 2008:294).

The APA (2019:np) contended that error rates could be controlled and managed by proper training of examiners, as well as the implementation of the following measures:

- The emotional state of an examinee should be assessed.
- A polygraph examiner should take cognisance of any medical information relevant to the physical condition of the subject.
- Specialised tests should be conducted to recognise an examinee who was overly responsive, as well as to calm an anxious individual.
- Good control questions should be formulated, in order to assess the response capabilities of an examinee.
- Factual information of the case should be assessed and analysed prior to the polygraph examination.
- A thorough pre-test interview should be conducted, which should encompass a meticulous review of the questions on the test.
- Quality control reviews must be done.

Despite the fact that overall accuracy rates of polygraph as reflected in many studies were high, errors did occur with either false negatives or false positives. This may not be seen in a positive light, but it was relevant and beneficial that polygraph research acknowledged and recognised that errors could and did occur. Polygraph examiners should take cognisance of this, and take extra precautionary measures to ensure that reliable and valid polygraph examinations were conducted and were compliant with APA bylaws and ethics (Krapohl et al, 2012:35).

2.12 POLYGRAPH AND THE COURTS

There was no legislation regulating the use of polygraph in South Africa. Nienaber (2014:2-7), Rheeder (2012:16), and Collier (2001:26) pointed out that there was a dearth of reported cases or judgements dealing with the admissibility and applicability of polygraph evidence in South Africa. No courts, albeit criminal, labour or civil, had any guidelines as to when or how a polygraph examination would be acceptable as evidence on its own. In *M Shinga vs Gilbeys Distillers and Vintners (Pty) Limited* (case no NII/2/10237, 1999, Durban), the presiding officer indicated that the attorney for the respondent correctly pointed out that "there is still no uniform approach to the admissibility of polygraph tests".

Generally, the courts were cautious and often conservative in their approach to matters of relevance and admissibility of evidence. It was at the discretion of the court to determine whether an individual was credible or truthful, by considering their evidence and that of other witnesses. As a result, the courts were apprehensive in attaching significance to polygraph examination results, as it would require that the magistrate or judge follow the evaluation of the polygraph examiner. The reluctance may also be ascribed to the fear that the admission of polygraph evidence could lead to a long, drawn-out investigation into many collateral or unforeseen issues which, once identified, would be of little probative value regarding the relevant issues.

Nienaber (2014:7) submitted that, as in the USA, in the 1995 decision of *United States v Posado* 57F 3d 428, a three-step enquiry regarding the admissibility of polygraph test results should be followed, in order to determine –

- whether the evidence was pertinent and trustworthy.
- whether the evidence helped the legal proceeding identify facts that were relevant to the issues.
- whether the probative value in a specific case prevailed over the practical disadvantage of receiving such evidence.

Since the polygraph was still a relative novelty in the South African legal fraternity, it was beneficial to look at the application and status of polygraph in other countries.

2.12.1 An international perspective of polygraph in the legal system

2.12.1.1 The US

The court proceedings of *Frye v. United States* in 1923 addressed the admissibility of an early version of the polygraph. During that time, the Supreme Court ruled that polygraph was not “generally accepted” by scientists, and should not be admitted (Krapohl et al, 2012:91; Vaughan, 2015:3-6). Eighty years later, the state of Connecticut adopted the Daubert test in the *State v Porter*, which involved the admissibility of polygraph evidence. In this case, the defendant sought to present polygraph evidence in order to prove that he was not lying when he stated that he was not involved in an arson incident; however, the Connecticut court had a rule against admitting polygraph evidence. The defendant tried to change this rule by presenting evidence that the polygraph was reliable. After scrutinising the evidence prudently, the court opted to maintain its rule that polygraph was inadmissible in a legal proceeding, for the simple reason that it was possibly prejudicial to the defendant. In essence, the court was concerned that if a jury was presented with scientific evidence that proved the defendant was truthful when he said that he was not involved in the incident, the jury would not consider all the other facts presented (Vaughan, 2015:6-7; Lissitzyn, 2008:284).

The court cases regarding admitting polygraph tests were usually about whether the defendant could introduce polygraph tests that supported their innocence. A polygraph test was rejected in 1923 in the Frye case, because it was held not be “generally accepted”. This case set the standard for forensic expert evidence for many years, and to date it was still the case in some states. The polygraph had, without doubt, improved and evolved since the Frye case, and presently, some states in the US do not admit polygraph evidence while many other states do. New Mexico was one of the first states to admit polygraph evidence, but with strict rules that must be adhered to. The Federal Court did not ban polygraph tests per se, or automatically, but they were rejected in most cases unless both parties had agreed in advance that the test results will be admissible (Lissitzyn, 2008:283).

Lissitzyn (2008:302-300) outlined the approach adopted by New Mexico, where it was ruled that a party who intended to introduce polygraph evidence provided notice to the opposing party, at which point the court could compel the person who took a voluntary polygraph to take another with an examiner of their choice. If the examinee refused, no polygraph testimony may be introduced. In 2004, in *Lee v Martinez*, on appeal by a defendant who wanted to have his polygraph test results admitted at the trial, the New Mexico Supreme Court found that the polygraph had met the Daubert standards (Vaughan, 2015:14-16).

The court found that the polygraph results were sufficiently reliable to be admitted on the condition that a polygraph examiner was befittingly trained and competent, and the polygraph examination done as required where the following measures were adhered to before polygraph evidence could be admitted:

- The data generated from the polygraph examination was assessed in an accepted manner.
- The polygraph examiner probed the health, education, background and other information that could be relevant from the subject.
- The polygraph examiner asked a minimum of two relevant questions in the polygraph test.
- The questions on the test were asked a minimum of three times
- The pre-test interview and in-test phases of the polygraph examination were recorded on audio or video (Vaugh, 2015:15).

The court further concluded that it was unfair for law enforcement officers to use the polygraph to assist in their decision-making processes, in order to determine a credible foundation for arrest when investigating criminal cases, or whether or not to prosecute in criminal matters, but turn around and argue it should not be admissible at trial (Vaugh, 2015:16).

2.12.1.2 Israel

The Israeli Supreme Court rejected polygraph evidence as admissible evidence in 1970. In 1982, the Justice Department Inquiry Committee examined the admissibility of polygraph evidence. Finally in 1988, the Supreme Court ruled that polygraph results

were admissible, with conditions, in civil cases. It was also ruled to be admissible in a pre-trial procedure in criminal proceedings. Currently, the polygraph was used extensively in family courts, in restraining order requests, and the Rabbinical Court, which was the only authority that dealt with marriage and divorce (Amsel, 2015:47).

Although polygraph evidence was admissible in some states in the US, and to a limited extent in Israel and Japan, in many other countries where polygraph was used, evidence emanating from the polygraph was not permissible in court proceedings, for various reasons.

2.12.1.3 Australia

In the Australian legal system, the use of the polygraph was constrained. Polygraph was unregulated in all states except in New South Wales which had legislation prohibiting the use of polygraph in some criminal investigations. Between 1978 and 1980, only six people who were charged with serious criminal offences in New South Wales submitted to polygraph examinations which were conducted by a polygraph examiner in private practice (McMahon, 2003: 25-26).

In *Raymond George Murray* 1982 7A Crim R48, the accused sought to have the polygraph examination results admitted at the trial in order to exonerate themselves. The court however, rejected the polygraph evidence because, according to the court, it was the responsibility of a jury to determine the outcome of a case. Moreover, a polygraph examiner was not considered to be an expert in the case. The polygraph evidence presented was consequently not deemed as that of an expert witness, and was considered to be hearsay (Rheeder, 2012:16; McMahon, 2003: 26-27).

According to McMahon 2003:26, the use of polygraph in criminal investigations was supported by some state police forces, police associations and organisations representing victims of crime. In Victoria, Queensland and Western Australia, polygraph examinations were from time to time used in criminal investigations by the police. Despite an increase in the utilisation there was very little written about polygraph testing in Australia.

2.12.1.4 South Korea

According to Lee (2010:18-19), the Supreme Court rejected results from polygraph examinations, as it espoused that polygraph results were unreliable and irrelevant for knowing the truth. The first decision to address the admissibility of polygraph evidence was made in 1979, when the court endorsed that polygraph evidence was inadmissible unless the following three assumptions could be adhered to:

- Lying triggered changes in human psychology.
- The psychological fluctuations caused physiological reactions.
- The polygraph instrumentation and testing were able to correctly measure the physiological reactions, and consistently determine whether the subject was telling the truth.

It was further argued that the applicable factors for a scientific polygraph examination encompassed a credible instrument, a reliable and standardised testing format, as well as a qualified examiner. The court found that all the prerequisite requirements had not been and could not be met. Polygraph results were therefore ruled to be inadmissible. The court concluded that even when the polygraph evidence qualified to be admitted, it should only serve as circumstantial evidence and not direct evidence. Finally, the decision to take a polygraph examination should be voluntary, for admissibility purposes.

2.13. POLYGRAPH AND THE LEGAL SYSTEM IN SOUTH AFRICA

In the legal system in South Africa, Rheeder (2012:6-7) stated that while polygraph evidence could be admitted in labour court proceedings, it had to adhere to certain conditions. Rheeder (2012:8) outlined the rules for a polygraph examination to be admissible as follows:

- An employee could not be forced by the employer to undergo a polygraph examination, and refusing to take the test was neither indicative of guilt nor grounds for dismissal.
- The questions on the polygraph test should not be vague or ambiguous, and the polygraph examiner and employer should agree on the questions.

- An employee must give informed consent in order to continue with the polygraph examination.
- In general, it was acceptable that an employer used the polygraph in specific incident investigations in circumstances where the employee was in a position to access the property that was the focus of the probe. Additionally, reasonable suspicion had to exist that the employee/s participated directly or indirectly in the incident. Finally, it had to be evident that the employer did indeed suffer a financial loss. Polygraph examinations could therefore be used to combat theft, fraud or serious substance abuse that had an adverse effect on the company/organisation.
- The outcomes of the polygraph examination could not be divulged to anyone other than the person who was authorised to receive the results.

A polygraph examiner in South Africa may be requested to give evidence as an expert witness in a disciplinary hearing and/or at the Commission for Conciliation, Mediation and Arbitration (CCMA) tribunal, provided that the chairperson and commissioner allowed it upon determining whether the evidence was admissible and the probative value thereof (Rheeder, 2012:9). In general, polygraph evidence was inadmissible if the polygraph examiner did not submit qualifications and accreditation even if they were not required to testify. Granted that evidence as a result of a polygraph test may be accepted, the results solely could not attest to guilt, as there had to be corroborating evidence before it could be regarded as conclusive proof. The results of a polygraph test could be sufficient to be admissible in a proceeding if it added to additional circumstantial evidence.

According to the CCMA Information Sheet: Polygraph Testing (CCMA, 2002:np), it was permissible for employers to use the polygraph when investigating specific incidents, taking into consideration the following criteria:

- The employee was in a position to access the items that were stolen and was the focus of the investigation.
- Justifiable suspicion existed that the identified employee played a role in the alleged offence.
- The employer had endured financial losses, or the business had experienced injury by way of company property being stolen.
- The proprietor was trying to fight corruption in senior posts within the company.

- The company was addressing substance abuse as well as dishonesty in the establishment.
- The organisation was combating the misrepresentation of company documents as well as dishonesty concerning the correct identity of individuals involved.

The CCMA accepted polygraph examiners as expert witnesses, and as such it was a prerequisite that the evidence that they submitted was verified as reliable. Polygraph test results could be considered as an aggravating factor when there were additional evidence of misdemeanours, but on its own it could not be interpreted to imply guilt. In essence, this means that the findings emanating from a polygraph examination, without any corroborating evidence, were not sufficient for a guilty verdict (CCMA, 2002:np). The CCMA further advised that it was against the South African Constitution (South Africa, 1996) for any person to be forced to submit to a polygraph examination. A person had to give consent in writing, and had to be cognisant of the following:

- A polygraph test was voluntary.
- A polygraph examiner could only ask questions during the in-test phase that were reviewed during the pre-test interview.
- If need be, an interpreter could be used.
- If the examinee preferred, another individual could sit in during the actual test, as long as there was no interference in any way during the examination process.
- No person should be abused or threatened in any way.
- There should be no discrimination.

The commissioner in *PETUSA obo Van Schalkwyk v National Trading Co* commented that the court should not accept polygraph examinations if no supporting evidence was presented (Marks, 2014:48-49; Prinsloo, 2007:50). In this matter, the credentials of the polygraph examiner were considered to be above reproach, and therefore his evidence as an expert witness was accepted by the commissioner. It was also found by the commissioner that there was further corroborating evidence that supported the finding that the employee was guilty. It was for those reasons that testimony regarding the polygraph was accepted, and given due consideration in maintaining the employee's dismissal.

Polygraph evidence was assessed and accepted by the commissioner at the Metal and Engineering Industries Bargaining Council in *NUMSA obo Mkhonza and others and Assmang Chrome Machadodorp Works* (Marks, 2014:50). The employees were charged with dishonesty. Property to the value of about two million rands could not be accounted for. The applicants in the matter submitted to polygraph examinations, and subsequently failed. The admissibility and the weight of the polygraph evidence were considered. The commissioner argued that the admissibility of the polygraph evidence was not in dispute, but the evidentiary weight attached to the evidence was so. The commissioner rationalised that admissibility would only be an issue when –

- (i) there were doubts regarding the polygraph examiner's qualifications.
- (ii) no oral evidence was presented by the polygraph examiner.
- (iii) there were no voluntary consent by the employees to submit to the polygraph examinations
- (iv) the examinees did not know or were not informed of the purpose of the polygraph examination.

It was determined by the commissioner that the amount of circumstantial evidence corroborated by the polygraph examination results led to the conclusion that the trust relationship between the employer and employees had been irrevocably damaged. The polygraph evidence was, therefore, accepted in this matter, due to the fact that there was corroborating evidence supporting the deceptive outcome, which in this instance was found to be on par with dishonesty.

In *MEWUSA obo Mbonambi and S Bruce cc ta Multi Signs (2005) 14 MEIBC* (Marks, 2014:50; Prinsloo, 2007:52-53), the applicants were also subjected to polygraph examinations, but these were not analysed by the commissioner. It was however, recognised that the polygraph examiner testifying was indeed an expert in his field, although his qualifications and experience were not challenged, and his background or expertise was not cross-examined. It was reasoned by the commissioner that it was, in the main, acceptable that the employer used polygraph examinations on personnel who were under suspicion for being deceptive. The employer could not completely rely on the findings of a polygraph test, however. Polygraph results might nevertheless be taken into consideration when there were further compelling reasons to suspect that the personnel were dishonest.

Generally, an employer submitted polygraph evidence in support of a disciplinary matter or dismissal; however, in *Simani and Coca-Cola Fortune* (2006) 15 CCMA 8.8.7 (Prinsloo, 2007:53-54), it was the employee who requested to present the results of a polygraph examination. In this matter, after being charged, Simani, the employee, was dismissed. The employer uncovered that certain drivers were involved in the theft of stock. Simani underwent a polygraph examination, which he passed. Notwithstanding these facts, and even with other evidence presented, his employment was terminated. During the CCMA hearing, the commissioner argued that regardless of the fact that Simani had passed the polygraph examination, he was an unreliable and unbelievable witness, which had worked against his defence. The case was concluded with the commissioner maintaining that polygraph evidence should be considered with care, and was, in the main, inadmissible in courts in many countries, unless the results of a polygraph test were corroborated by additional definite evidence.

Although the CCMA and/or the Labour Court had accepted polygraph evidence in certain cases, in other instances it was been rejected. In *Steen and Wetherlys (Pty) Ltd*, the applicant, who was a branch manager, was fired after being found guilty of dishonesty relating to theft or 'gross negligence', on the strength of a polygraph examination as well as the evidence of the investigator who had used information that had been given by an anonymous informant. The commissioner argued that polygraph evidence was inadmissible, on the grounds that a polygraph examination was not scientific, and therefore the evidence submitted by a polygraph examiner was merely his opinion.

The validation for the commissioner's repudiation of the polygraph examiner's evidence as opinion was based on the fact that the polygraph examiner did not have the medical skill or knowledge to make a determination about the effects of a person's temperament, emotions, or any medication that the examinee could have been using which could have had an influence on their responses. The commissioner also remarked that, based on his own research, he had not come across anything in any study, literature or expert in case law that convinced him that polygraph examiners were expert witnesses, had any medical skills or qualifications, or were experienced to infer the physiological reactions of an individual subjected to a polygraph test.

The commissioner further pointed out that the evidence from the polygraph examination was considered inconclusive, as all it indicated was that the examinee was experiencing increased emotional arousal. A polygraph examiner was not in a position to distinguish anger, anxiety, tension or stress from feelings of guilt. The outcome of the polygraph examination could therefore have been influenced by the fact that the polygraph examiner was an unknown person, and that the test could have been conducted in a setting that was unfamiliar to the examinee. It could therefore have been any of these factors that could have caused the subject to be more nervous – which could have had an impact on the physiological reactions exhibited.

Additionally, it could be argued that an innocent person was afraid that the test results would not decorously reflect their innocence, which could also intensify their physiological reactions, thereby causing the innocent examinee to fail. Coupled with an adrenaline rush, it might be sufficient for the polygraph examiner to conclude deceit when there was in fact none. It was finally resolved that the polygraph examiner's opinion of 'deception indicated', which was inferred to be indicative of dishonesty and guilt, was an irrational and unjustifiable extrapolation.

In *DHL Supply Chain (Pty) Ltd and others v National Bargaining Council for the Road Freight Industry and others* [2014] 9 BLLR 860 (LAC), the Labour Appeal Court (LAC) (per Sutherland AJA, Ndlovu JA and Molemela AJA) maintained that it was insufficient to find an employee guilty of dishonesty simply for failing a polygraph test. Moreover, the proprietor was likewise compelled to present expert evidence that demonstrated the value and reliability of the polygraph tests if they intended using the results emanating from the test.

In this matter, the loss of stock was experienced. Eight warehouse employees were requested to submit to polygraph tests. Two people who failed the polygraph examinations were charged with theft after an internal probe, and subsequently dismissed. An unfair dismissal dispute was lodged with the bargaining council, by the dismissed workers. The bargaining council ruled that their dismissals were found to be fundamentally flawed, which resulted in their reinstatement. The employer then set in motion a review application in the Labour Court which was also dismissed. Finally, the company appealed to the Labour Appeal Court, alleging that evidence presented

revealed that the dismissed personnel were, in fact, guilty of theft. It was further maintained that if dismissal of the employees had been deemed unfair, reinstating them was not the applicable solution, as compensation would have been more apt. In this particular matter, the polygraph evidence presented was disregarded by the commissioner. It was reasoned that because the workers had been at work at the time of the alleged theft, could access the area where the allegedly stolen property was, and that the disappearance of stock stopped when the workers were fired, was insufficient to conclude that they were, in fact, guilty of theft.

The court deduced that just the polygraph test results were not sufficient to prove guilt. The Labour Appeal Court further maintained that the weight attached to polygraph examinations continued to be an open question. If a party wished to depend on polygraph evidence, expert evidence had to be submitted regarding polygraph accuracy, as well as reasons why any conclusions should be inferred from it. The Labour Appeal Court found, in this specific case, that no expert evidence was presented regarding the theory of the polygraph or on the technical integrity of the procedure. The submissions tended by the polygraph examiner also did not qualify as expert evidence, for the reason that the polygraph examiner lacked independence and satisfactory qualifications and credentials. In quintessence, within the labour law environment, some commissioners deemed polygraph examiners to be expert witnesses, whereas others did not.

Currently there was no precedent on the admissibility of polygraph as evidence in criminal courts, although a maiden search on the SAFLII website indicated that references to polygraph was made in certain criminal cases such as *Moliedi and another v Minister of Safety and Security and others* 14060/2010[2012] ZAGPPHC9 (13 January 2012), *Mathobela and another v S* (A 172/2011)[2012] ZAGPJHC 80 (26 April 2012), and *Joubert v Nedbank Ltd* (1476/09)[2011] ZAECPEHC 28 (5 July 2011). In these cases, mere reference was made to the polygraph, but the role of the polygraph examinations were not highlighted, queried or challenged.

Matte (1996:67) also merely referred to two instances where polygraph examinations were presented as evidence in court. In September 1995, in the Pretoria North Criminal Court, a polygraph examination was admitted into evidence by the

magistrate, and in September 1995, polygraph results were used to strengthen the police's case in the bail application of a person charged with arson in Cape Town. Van Damme (2001:4) referred to the Booysen's Magistrates Court in 1996, accepting two polygraph tests as evidence. In all cases where polygraph was referred to, no further details on the cases were known or could be found.

Within the South African context, no actual status was attached to polygraph evidence in criminal proceedings. Whether or not polygraph results or evidence was or would be allowed in court, was therefore at the discretion of the presiding officer to decide. Confessions obtained before or after polygraph examinations may, however, be admitted in criminal proceedings in terms of section 217 (1) (a) of the Criminal Procedure Act 51 of 1977.

2.14 CONFESSIONS AND POLYGRAPH

2.14.1 Confessions

Lyman (2013:108) defined a confession as a "direct acknowledgement by the suspect of his/her guilt in the commission of a specific crime, or as being an integral part of a specific crime". Joubert (2010:321) concurred that a confession was an explicit, clear and open admission of guilt, whereby an accused made a statement acknowledging all elements of the crime. When the confession was made in court, it amounted to a plea of guilty, if possible grounds of justification were excluded. The statement had to be read in its entirety, and words given their ordinary meaning, although the intention for making the confession was not important.

In the US and Canada, confessions obtained during or after a polygraph examination were admissible, as long as they met the constitutional standards (Vaughan, 2015:np; Galiano, 2015:58). In the South African legal system, the accused could only be found guilty of an offence if the confession made was "confirmed in a material respect" to ensure that the confession made was not a false confession, or if there was other evidence corroborating the confession (Joubert, 2010:315). When a confession or any admissions were made, it was imperative that the following rights set out in the South African Constitution were especially adhered to:

- Section 35(1)(a)(b) - Right to remain silent
- Section 35(1)(c) - Right not to be compelled to make a confession or admission that could be used as evidence against him/her
- Section 35(2)(b)(c) - Right to legal representation
- Section 35(3)(j) - Right not to be compelled to give self-incriminating evidence

Confessions and/or admissions customarily emanated from the questioning of a suspect. It was therefore crucial for investigators to be aware that they were only allowed to question a suspect within reasonable limits. These limits meant that the individual being questioned could not be forced in any way to divulge any information. Furthermore, prior to any questioning, they had to be informed of their constitutional rights by means of a warning (Joubert, 2010:316).

Hanekom (2016:36) highlighted that the SAPS polygraph examiners were obliged to inform a person subjected to a polygraph examination of their constitutional rights. The person had to verify that they understood their constitutional rights as well as the purpose of the test in writing. The examinee also had to be informed of their right to obtain advice from an attorney prior to consenting to the polygraph examination. Should an examinee not give consent to the polygraph examination, the test had to be terminated.

A polygraph test by a police polygraph examiner would also be terminated immediately if it became known that the examinee was threatened, coerced or assaulted, in order to obtain consent for the polygraph examination. From the onset it had to be made known to the examinee that the polygraph test was voluntary. Although notes were made by the polygraph examiner, the entire polygraph process had to be video-recorded.

In South Africa, Section 217 of the Criminal Procedure Act set out guidelines regarding the admissibility of a confession in the South African criminal courts, as outlined by Joubert (2010:322-326):

- A confession had to be made personally by the accused themselves, as no person could make a confession on behalf of the accused.
- The accused had to accept everything that was enclosed in the statement and reconciled themselves with it.
- A confession made by the accused in their sound and sober senses had to be done freely and voluntarily without any excessive influence.
- If a confession was made to a private person, justice of the peace or magistrate, it did not have to be in writing.
- Should it be, however, that a confession was obtained by a peace officer, who was neither a judicial officer of a lower court nor a magistrate, then the confession had to be taken down in writing and confirmed as soon as possible before a magistrate or justice of the peace. This was to afford the accused some protection by necessitating that they were brought before an objective official who would not pressurise them into a confession. This would also ensure that the statement was made freely and voluntarily. A commissioned officer who was not the IO or part of the investigation, could also take down a confession.

According to Orthmann and Hess (2013:197), the use of the polygraph was found to provide law enforcement officers with a psychological advantage that could lead to admissions and/or confessions. Unfortunately, a literature search did not reveal any South African cases in legal proceedings where confessions obtained during or after a polygraph test were admissible.

2.14.2 Admissions

Lyman (2013:108) described an admission as a statement that was made by a suspect that was self-incriminating. An admission acknowledged certain facts or circumstances from which guilt could be presumed. In the Regional Court, Pretoria, in 14/2715/09, a murder case, a polygraph examination was conducted on the accused. The accused failed the polygraph test, and during the subsequent post-test interview, admissions were made by the accused to the polygraph examiner. During a trial-within-a-trial, the admissions made were challenged, and during judgement Magistrate KH Bosch highlighted the following concerns pertaining to the admissibility of the admissions:

- The polygraph examiner had to inform an examinee of the consequences, should the test be failed. It also had to be emphasised to the individual, that should a person fail the polygraph test, they would become a suspect and could be interrogated.
- The consequences of a person incriminating themselves had to be carefully explained to them. If an examinee stated that they stabbed a person, they had to be made aware that they could be charged for murder.
- An interpreter should be used if an examinee's first language was not the same as the language in which the test was being conducted, because in this matter there was doubt whether the examinee understood all that was said during the post-test.
- Once admissions were made, it should not amount to a confession of a lesser charge – for instance, "I stabbed the man with a screwdriver" amounted to a confession of an assault with the intention to cause grievous bodily harm, and not murder.
- The examinee had to be informed what the purpose of the test was, and should the examinee indicate that they were not aware as to why they were there, it suggested that the examinee was coerced or misled into taking the polygraph examination.
- The examinee had to be explicitly told of their constitutional rights – in particular, their right to an attorney.
- A person's constitutional rights had to be reiterated at the onset of the post-test interview, as it was too late to inform them after any admissions were made.
- A polygraph examiner had to be 100 percent certain that an examinee was medically suitable to continue with a polygraph test. In this matter, the examinee alleged that he had piles. The polygraph examiner asked if he was okay to continue, and the examinee indicated that he was. The magistrate pointed out that this could have been because the accused felt intimidated. The polygraph examiner should have afforded the accused the opportunity to seek medical attention and/or waited until the examinee had recovered.

The admissions that were made to the polygraph examiner were consequently inadmissible in this matter.

The trend in the past few years has been to move away from confession-based investigations to more scientific investigatory methods. The requirements contained in section 209 of the Criminal Procedure Act showed clearly that an IO could not rely exclusively on a confession in their investigation in an attempt to secure a conviction. Other reliable and undisputed evidence, independent from the confession, which would prove that the offence was indeed committed by the suspect, had to be obtained (Joubert, 2010:403). By the same token, just as investigators should not rely predominantly on confessions to solve their cases, neither should polygraph examinations be about obtaining confessions, as many polygraph examiners tended to focus exclusively on obtaining confessions before, during or after a polygraph test.

At the APA conference in September 2015, Nelson (2015:np) emphasised that the goals of conducting polygraph tests were ultimately the following:

- Disclosure of information
- Deterrence of problems
- Detection of deception and truth

It was therefore imperative that polygraph examiners were realistic about the capabilities of the polygraph, as they had a responsibility to provide information and results that were interpretable and useable within the boundaries of reality.

2.15 SUMMARY

In this chapter, existing literature on the polygraph from different sources, internationally and locally, were reviewed. The literature review was initiated by contextualising the key concepts of deception, perception, and understanding the roles and responsibilities of investigators within the SAPS. It was also imperative to understand the background, polygraph theory, polygraph procedure, as well as the purpose of polygraph examinations. Against this backdrop, the literature search reflected on the use of the polygraph internationally, before narrowing it to the South African context. As a result, it was revealed that there was a scarcity of South African literature and studies pertaining to the use of the polygraph. It was also apparent that there was an absence of information or research initiatives by the law enforcement community, unlike in the US, Canada, Israel and Japan where law enforcement

agencies, such as the police, played an instrumental role in initiating training, as well as research and development.

Over the years, there were several postgraduate dissertations by South African students in the labour law field, but there was a scarcity of studies available by law enforcement. Polygraph has been in use by the SAPS as an investigative tool for more than 20 years, but were no studies published, nor have there ever been any initiatives towards any kind of legislation or regulation of the polygraph in South Africa, despite there being a number of CCMA court rulings regarding the use and admissibility of the polygraph. Based on the existing available literature, it was therefore not known whether or not the polygraph was a useful and viable investigative tool in its application in criminal investigations by the SAPS.

It is envisaged that the chapters to follow will be able to determine whether the polygraph was indeed a valuable investigative conduit, as pointed out by published international research. Chapter 3 encompasses the research design, procedures ensuring trustworthiness, data collection methods, data analysis strategies and ethics, to investigate perceptions and experiences of investigators in the SAPS regarding the application of the polygraph as an investigative aid.

Chapter 3

RESEARCH DESIGN AND DATA COLLECTION

3.1 INTRODUCTION

An in-depth discussion of the research design used in the empirical phase of this study is presented in this chapter. Additionally, an overview and details of the research design used to answer the main research question, namely 'What are the perceptions and experiences of SAPS investigators regarding polygraph as a diagnostic tool in criminal investigations in the South African context?', is also discussed. The forthcoming chapter, therefore, presents the research design, data-collection methods as well as data analysis processes that were used. The ethical measures applied, including measures undertaken to ensure trustworthiness (validity and reliability), are also highlighted. The main purpose of the study was to determine and understand the perceptions and experiences of investigators in the SAPS regarding the application of polygraph in criminal investigations.

3.2 QUALITATIVE RESEARCH APPROACH

Rahi (2017:2) highlighted the fact that the qualitative approach was used to collect comprehensive information on a particular topic. Patton (2014:14) added that it facilitated a thorough and detailed examination of a subject. The qualitative approach also assumed that it was important to interpret the feelings and emotions of a person, which was often disregarded in quantitative research studies. Howitt and Cramer (2014:338) proclaimed that qualitative studies focused on the explanation of the qualities or characteristics of the data, by concentrating on conversations and real-life situations, interviews, media and counselling. They were seldom bothered with analysis of individual words, phrases, or even sentences, as they analysed expansive units of texts.

Flick (2011:12) asserted that qualitative research did not actually begin with the theoretical model of the subject being studied, nor did it desist from hypotheses and operationalisation. It was also not moulded on measurement as in the natural

sciences, nor was there concern with standardising the study or in ensuring representivity by the random sampling of participants. Instead, in qualitative studies, participants were purposively selected and incorporated in a small number of cases according to their relevance. The data collection process was designed in a translucent way. It was for this reason that fewer questions and answers were designed in advance, as predominantly open questions were used, whereby it was expected that the participants provided answers to the questions extemporaneously in their own words.

The advantage of a qualitative study was that it comprehensively and precisely analysed a few cases where the participants had more freedom to decide what was relevant to them, and to present information within the appropriate context. On the other hand, the disadvantage was that analyses were frequently time consuming, and results were generalised to the broader community in a very limited way (Flick, 2011:14). Howitt and Cramer (2014:340), however, emphasised that a qualitative method provided a thorough understanding of the issue studied. It was also the view of Howitt and Cramer (2014:348) that a qualitative research study was ideal in the following instances:

- when it was the intention of a researcher to study the complexity of a particular subject in its regular site.
- when there was uncertainty regarding the key theoretical issues, as well as what research questions should be posed.
- when there was limited or no known research regarding the particular topic.
- when a research question related to the intricate use of language, such as in long drawn out conversations or other documentary material.
- when the use of a structured format, such as the use of multiple-choice questionnaires, would possibly deter prospective participants from contributing to the study.

A methodology such as the qualitative approach, that lent itself to flexibility, was deemed ideal for this project, as the study encroached on an area that was not necessarily transparent to a person outside the polygraph and/or law enforcement fraternity. Having a background in criminal investigations, and experience as a polygraph examiner within the SAPS, the researcher was confident that the support of

investigators within the SAPS environment could be gained, in order to suitably explore and understand their perceptions and experiences of polygraph application in criminal investigations. In this study, a qualitative approach was also reasoned to be a logical choice for the following reasons:

- There was scarce research regarding the application of polygraph within the law enforcement community in South Africa, and this approach was deemed ideal for researching this particular topic.
- It supported the empirical design, as it was beneficial to listen to and recognise the perceptions and experiences of the participants, in order to attain a comprehensive understanding of their experiences and views in their own words.

As the qualitative research approach did not generally provide a step-by-step plan or rigid stages to be followed, it was the choices and actions of the researcher that decided the research design (De Vos et al, 2011:272). Although a number of research designs existed, Creswell (2014:187) distinguished between five research designs by selecting those which epitomised diverse disciplines, had meticulous procedures, had proven to be popular and were habitually used. The five most common research designs that could be considered to design qualitative research were, therefore, phenomenology, the narrative, ethnography, the case study and grounded theory (Creswell & Creswell, 2018:np; Creswell 2014:187).

3.3 THE RESEARCH DESIGN

Thomas (2013:103) referred to a research design as the “plan” for the envisaged study. Cognately, Babbie and Mouton (2012:72-75) stated that a research design was a plan that specified the way the study was to be directed, by concentrating on the study that was planned and the results envisioned. From the onset, cognisance had to be taken of the fact that although the research problem or research question was focused on the kind of evidence that was required, it had to ensure that the research question was adequately addressed. Anderson (2013:59) elaborated that a research design was the plan articulated in guiding the gathering of data and, thereafter, the analysis of the gathered data.

In this study, the type of research conducted was exploratory in nature. Rahi (2017:2) postulated that research which was exploratory in nature endeavoured to seek out new acumen and discover what was transpiring. It attempted to ask questions and evaluate the phenomena from a new and different viewpoint. Exploratory research was generally embraced in the initial stages of a study where ideas were not sufficiently distinctive in order to advance an operational definition. Neuman (2014:38) and Babbie and Mouton (2012:79-80), postulated that most social research were commissioned to explore an issue or to afford a general understanding of a particular subject matter. This approach was appropriate when the subject matter was a relatively new interest. An exploratory study customarily resulted in insight and comprehension, rather than an assortment of in-depth, precise, replicable information, as a study of this nature frequently involved the use of exhaustive interviews, the scrutiny of case studies and the use of informants.

The fundamental research design consideration that this study took cognisance of, was the necessity to follow a transparent and flexible research strategy by using methods such as interviews, informants, case studies and the reviewing of existing literature, which lead to insight and comprehension. Exploratory studies were valuable, as they were essential when new ground was being broken, almost always yielding new insight into a research topic. The foremost limitation of an exploratory study, however, was that the research question was rarely answered satisfactorily, although the results could hint at the answers and provide insight into research methods that could afford conclusive answers (Neuman, 2014:38; Babbie & Mouton, 2012:80;).

Researching SAPS investigators' perceptions and experiences of polygraph as an investigative aid in criminal investigations did not perceptibly fit into any particular theory. This research was, therefore, exploratory, as it endeavoured to understand the perceptions and experiences of investigators regarding polygraph examinations as a diagnostic aid in criminal investigations. Understanding was also sought in regard to why some investigators used the polygraph and many others opted not to make use of polygraph examinations as a diagnostic aid in their investigations.

3.4 GROUNDED THEORY

In this study, grounded theory was the particular research design selected. Charmaz, Thornberg and Keane (2018:722), Bryant (2017:63), Howitt (2016:47), Edmonds and Kennedy (2017:145), Thornberg and Charmaz (2014:153), Holton (2008:67) and Charmaz (2006:4) stated that Anselm Strauss and Barney Glaser (who advanced the grounded theory methodology) were of the view that a theory could develop as a result of qualitative data analysis.

Babbie (2017:490) defined grounded theory as “an inductive approach to the study of social life that attempted to generate a theory from constant comparing of unfolding observations”. In grounded theory, numerous stages of accumulating, filtering and categorising of data took place. Grounded theory methodology was generally sought when little was known about the phenomenon being studied, as it went beyond giving narrative or thematic representations of the participants’ voices, as was common in other qualitative research approaches.

Edmonds and Kennedy (2016:145), Leedy and Ormrod (2016:274) and Willig (2014:144-145) postulated that the key purpose of grounded theory was to start with the data which was used to advance a theory. The word 'grounded' referred to the notion that the theory developed from the study which was derived from, and was embedded within, the data that was gathered at the site, rather than taken from literature. Grounded theory, therefore, essentially constructed a theory that was grounded in the data. It was also advanced by Neuman (2014:177) and Charmaz et al (2018: 720) that theory may be developed during the collection of the data, as grounded theory was predominantly an inductive process. This implied that data was collected, and conclusions were inferred, from what was observed from the collected data. It augmented flexibility, and enabled data and theory to work together. This method further allowed the study to be amenable to the unexpected. Consequently, if something new was discovered, the direction of the study could be changed.

Although detailed description and analysis of the subject matter was characteristic of a qualitative study, grounded theory went further than a narrative, in order to advance comprehensive concepts that related to a particular phenomenon. Interview data was

predominantly collected by making a number of visits to the field. The preliminary collection of data was carried out in order to obtain an array of perspectives on the issue studied. Thereafter, constant comparison was used to analyse categories of information. Data was obtained until there was saturation of information within the categories. At this point, a central issue was identified and selected, which led to the development of a story line. An interim matrix that stipulated the social and historical conditions and consequences influencing the phenomenon, was then proposed (Leavy 2017:148; McMillan & Schumacher, 2006:27).

According to Corbin and Strauss (2015:7), there were two distinct features of grounded theory: firstly, the concepts from which a theory was developed were not chosen before a study, but originated from the data that was collected during the research process; secondly, both the data analysis and data collection processes were interconnected. The preliminary data collected was analysed soon after collection, and the concepts derived were the foundation for the subsequent collection of data.

Cropley (2019: 130-131), Bryant (2017:111), Edmonds and Kennedy (2017:145), Thornberg and Charmaz (2014:155) and Charmaz (2006:5-6), summarised the defining components of grounded theory as follows:

- The gathering and breakdown of the data occurred at the same time.
- Analytic codes and categories were not preconceived, logically construed hypotheses, but were constructed from the data.
- The constant comparison method, which consisted of making comparisons at every juncture of the analysis process, was used.
- The development of theory was advanced at every step of data gathering and analysis processes.
- Memoranda were written to expound categories, identify their properties, delineate associations between different categories, and to detect gaps.
- Sampling was orientated towards building a theory, rather than for representing a population.

Lawrence and Tar (2013:35) and Leedy and Ormrod (2015:274) pointed out that grounded theory had the most influence in disciplines in which little research was

done. It was also especially helpful when contemporary theories regarding a topic were scarce or absent. This approach was therefore ideal for this study, as in the field of polygraph, specifically relating to its use within the context of law enforcement within South Africa, research was limited. Additionally, it was advantageous for this study to adopt the grounded theory approach for the following reasons:

- It was used to investigate problems in a logical and orderly manner that was 'grounded' in the data and not deduced hypothetically (Thornberg & Charmaz, 2014:153; Merriam & Simpson 2000:113): The knowledge that emanated from this study was the result of the data collected and analysed from the interviews with the participants.
- It was flexible regarding the data collection and analysis (Neuman, 2014:177; Thornberg & Charmaz, 2014: 153; Holton, 2008:80): This study was flexible and open to expect the unexpected, as polygraph in South Africa was not a popular research field within the law enforcement community.
- Procedures followed by the grounded theory approach allowed for the examination of topics, related behaviours and different perspectives which often lead to the evolution of comprehensive explanations (Strauss & Corbin 2015:11). These procedures could, therefore, be used to obtain new insight into old problems, as well as study new and emerging areas that required further investigation: This study reflected two divergent perspectives, namely participants who used polygraph as an investigative aid in criminal investigations, and participants who had never used polygraph in any criminal investigation. The two divergent groups of participants enabled a comprehensive understanding of the use of polygraph as an investigative aid in criminal investigations in the SAPS. It was beneficial to obtain new insight into the perspectives and perceptions of the primary users of polygraph examinations – something that was not previously established.

There was limited research in this field, although polygraph was used in criminal investigations. By conducting this study, based on the grounded theory methodology, it was envisioned that the findings would assist in determining whether polygraph, as a diagnostic aid in criminal investigations, was beneficial and viable. In addition, the

study sought to infer how polygraph could be optimally used by SAPS investigators in the course of criminal investigations in the future.

The procedure for conducting grounded theory studies originated with the initial collection of data, which was led by an open, general research question. The collection of the first data, which could be interview transcripts, observational records, textual data or any other types of data, was followed by analysis (Edmonds & Kennedy, 2016:145-147; Strauss & Corbin 2015:7). The collection of data and analysis progressed concomitantly. Issues that emerged from the analysed data direct where and how the successive interviews should proceed. With the coinciding data collection, further procedures, such as coding and categorisation, constant comparison, theoretical sampling and memorandum writing all worked hand-in-hand to generate the theory (Strauss & Corbin, 2015:7).

In this study, the initial data collection was led by an open general research question relating to an IO's experience regarding the application of polygraph in criminal investigations. The data collection, which took place by way of interviews and documents, were followed concurrently by the data being analysed. As the data gathering and analysis processes advanced, data collected from the first interviews directed the successive interviews. The initial ten interviews focused on participants who used polygraph in criminal investigations. As the interviews and analysis processes continued, it began to emerge that the some participants felt trepidation and had reservations regarding the application of polygraph. Accordingly, the study sought to engage with participants who had never used polygraph, to determine the reasons why polygraph was never an option as an investigative aid to them.

Theoretical sampling, which was generally used in grounded theory studies, was adopted for this particular study. Glaser and Strauss (1967:45) defined theoretical sampling as “the process of data collection for generating theory whereby the analyst jointly collects, codes and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges”.

3.5 THEORETICAL SAMPLING

At the onset of a study, a researcher had an idea of the subject matter that was going to be studied. Founded on this awareness, groups of people, an organisation, or a community representative of the particular subject matter could be selected for study (Corbin & Strauss 1990:8). It was pointed out by Timonen, Foley and Conlon (2018:8) that theoretical sampling had to be initiated in the beginning stages of a study, because the aim was to achieve an enhanced understanding of the characteristics and probable variant of categories and concepts that were evolving from the data. According to Timonen et al (2018:8), as the study evolves, theoretical sampling was further concentrated and steered at a smaller or idiosyncratic population or towards particular data sources. It was, as a result, supplemented by a more defined set of questions than initially envisioned. The objective was ultimately to reach data saturation whereby there were no further significant insight emerging.

Thornberg & Charmaz (2014: 155-156) and Charmaz (2006:100-101) suggested that the objective of theoretical sampling was to obtain data to help expound categories. When saturation of the data was reached, it echoed qualities of the participants' experiences and afforded a useful analytic grasp for understanding them. To summarise, it could be stated that theoretical sampling was only applicable to conceptual and theoretical development. It was not concerned with representation of a population or increasing the statistical generalisability of the findings. Theoretical sampling required beginning with data, building provisional concepts about the data, and then probing the ideas via further empirical inquiry. Memorandum writing led to theoretical sampling, which was specific, systematic and strategic.

Finally, Urquhart (2013:8) asserted that theoretical sampling was useful and relevant, as it enabled the justification of concepts in the theory by finding more instances of a particular concept, thereby enabling an emerging storyline suggested by the data, to be followed.

In this research, the initial study comprised of ten (10) participants who were investigators in the SAPS, identified from the Case Record Index Register in the Polygraph Section in KwaZulu-Natal. The findings from this initial sample directed the

study to give further insight into issues that emerged from the data. For instance, one of the most significant and fundamental issues that emerged from the data was the concerns regarding the application of polygraph expressed by the initial sample. Theoretical sampling began when the analysis of the first ten interviews were completed. The analysis then steered the sampling to non-users of polygraph, to ascertain why the majority of investigators were not using the polygraph even though some of their colleagues were doing so. The investigation was also directed at ascertaining whether non-users of polygraph had similar concerns to the IOs who were using polygraph, and whether these concerns were the reason/s that many investigators were not using the polygraph. Upon completion of the data collection and analysis processes, the total number of participants amounted to twenty (20).

3.6 DATA COLLECTION

A fundamental aspect of qualitative data was encased in the phrase “richness of data” (Howitt, 2016:397; Howitt & Cramer, 2014:352-353). It was further asserted by Howitt (2016:397) and Howitt and Cramer (2014:351) that qualitative data methods fundamentally contributed extensive, comprehensive and “rich” data for analysis. There were various methods that enabled data to be gathered appropriately for a qualitative analysis. Undeniably, any information that was “rich and detailed” rather than “abstract and highly structured” was more appropriate for qualitative analysis.

Flynn and Korcuska (2018:103), Howitt and Cramer (2014:351), as well as Corbin and Strauss (1990:5), stated that data for a grounded theory study emanated from interviews, observation, focus groups, biographies, in-depth interviews, conversations that were recorded, publications, media articles, documentary and historical records, government documents, video-recordings, letters, books, and sources from the Internet, which could assist in answering the research question. As advanced by Creswell (2014:191), for this study the most appropriate data collection methods were documents, which were an inconspicuous source of information that could be accessed at any time, and interviews, which allowed the researcher jurisdiction regarding the line of questioning.

3.6.1 Documents

Gathering data from documents epitomised a completely different stance, compared to the collection of data from people. Harding (2013:21) and Creswell (2014:191-192), posited that the use of documents as a method of data collection was advantageous, as it saved time and was generally easy to access. Documents could be accessed at the convenience of the researcher, and it saved the researcher the time and expense of transcription. The limitations were that not all people were similarly articulate, protected information could be unavailable for public or private access, the researcher would have to search for the information in sometimes hard-to-find places such as government archives, the required documents may be incomplete, and it was possible that the documents could be unauthentic or inaccurate.

In this study, documentary records were used to identify the research participants in the following way: Investigators were chosen from the list of investigators that had access to the SAPS Polygraph Section in KwaZulu-Natal, and were, therefore, easily accessible. The document consulted was the official Case Index Register, which was used by the section to record requests/applications for polygraph examinations by investigators. The Case Index Registers for a three-year period (2015 to 2017) were analysed, and investigators from police stations who had recurrently used polygraph during the past three years were initially identified to start off the data collection process.

3.6.2 Interviews

In this study, interviews were the dominant source of data collection. An interview was a discussion with a person to obtain information. Information may be facts, opinions or attitudes. The three common types of interviews were structured, unstructured and semi-structured. Each type involved the interviewer in face-to-face or telephonic contact with another person. A substantial amount of data could be gathered in this way, as people generally wanted to assist or give their opinions as long as it did not have adverse effects on, or repercussions for, themselves or their family, friends or colleagues (Leavy, 2017: 139; Thomas, 2013:194).

A structured interview was an interaction with another person whereby a predetermined list of questions was probed. Other than the predetermined questions, there was very little latitude for any further follow-up. The reason for this was that there was a degree of standardisation across the different participants interviewed. The advantages were that it could be administered effortlessly and swiftly, and the responses could be coded quite easily (Thomas, 2013:196).

Howitt and Cramer (2014:357) concurred that, in structured interviews, the interviewer generally attempted to follow a predetermined questionnaire. Structured interviews were not considered to be suitable for this study because, as pointed out by Strauss and Corbin (2015:7), in the grounded theory approach, the data from the initial interviews was followed by analysis. Consequently, data collection and analysis took place concurrently. Any issues that emerged from the data directed where and how subsequent interviews would unfold. For this reason, interviews had to be flexible to enable the collection of relevant data. Due to there being very little flexibility for follow-up questions, clarification or deviation from the predetermined questions, structured interviews were not ideal.

Howitt and Cramer (2014:357) compared unstructured interviews to a conversation. There was no predetermined format to the interview beyond a general interest in the topic. Participants were not confronted with a predetermined list of questions, as the notion behind an unstructured interview was that the schedule was set by the participant and this was not deemed suitable for this study.

Semi-structured interviews, which moulded the basis of this research, combined the structure of a list of issues to be addressed with the liberty to follow up on points, if or when deemed necessary. To obtain the best results in an interview that was semi-structured, an interview schedule, which was a list of issues to be covered, was outlined. The identified issues did not need to be in the form of questions, as they merely provided a mnemonic of important points for discussion. There was also no obligation that the points were addressed in any particular order or sequence, as it served as a reminder of what was intended for discussion. The interview schedule, which was compiled prior to the interview, was a framework of issues, leading to potential questions, possible follow-up questions and 'probes', which helped the

interviewees proceed with aspects of their answers, such as verbally saying 'go on', or non-verbal gestures such as a nod or raising of the eyebrows (Thomas, 2013:198). It was further suggested by Howitt and Cramer (2014:358) that semi-structured interviews were engaging to some interviewers because of the conversational characteristics.

Semi-structured interviews, which enabled a flexible approach to the interview process, were deemed the most suitable for this study. The interviews were considerably more open, and the conversations flexible. Participants were given the opportunity to lead the conversation, with reasonable guidance. This was to ensure that there was no deviation from the objectives of the study. In addition, an interview schedule was used to guide the respondents, to ensure as much information as possible was obtained, and that all participants were answering questions about the same issues, thereby ensuring that the interviews were standardised.

3.6.3 The interview schedule

An interview schedule which provided guidance during the interviews during the empirical phase of this study, is attached as Appendix "E". Taylor et al (2016: 122-123) and Howitt and Cramer (2014:358-359) opined that the interviewer should craft an interview schedule, which was the skeletal outline of the interview structure, that encompassed the issues and areas which should be addressed during the interview. The interview schedule could be augmented as more participants were interviewed, and issues that could not be, or had not been, anticipated at the inception of the study, could be addressed. The following issues, as postulated by Howitt and Cramer (2014:359), were taken into consideration when the interview schedule was prepared for this study:

- The recording of general information such as participants' age, gender or qualifications;
- The preparation of topics and questions were not merely an inventory of anticipated questions. Questions were not included because the responses would be fascinating. All questions were formulated based on what the study required, taking into account information that had been unearthed in preceding interviews;

- Themes and questions were planned in a purposeful, practical and insightful way that enabled the interviewer and the participant to deal with them. A logical structure was vital, as considerable thought was required of both the participants and the interviewer; and
- The interview schedule was outlined using language that was suitable for the participants.

The choice of questions in this study were shaped by the parameters within which the topic was explored, and, consequently, the fundamental focus was on the perceptions and experiences of investigators in the SAPS regarding the application of polygraph in criminal investigations. The interview schedule was designed to guide the investigators when conferring their perceptions and experiences regarding this phenomenon. The questions were formulated around central aspects in relation to the purpose of polygraph and whether it was regarded as a viable diagnostic aid in criminal investigations.

3.6.4 Field notes

Throughout the research process field notes were made, because it was advanced by Taylor et al (2016:79-82) and Tracy (2013:116) that it enabled a researcher to go back later to the original setting to re-examine the relationships. A diary, which was meticulously kept, recorded meticulous notes of the participants' facial expressions, tone of voice, comments and body language throughout the interview process.

The following excerpt of the diary that was kept for the study reflects a snippet of the notes made: "The participant was very well spoken and articulated himself confidently. His voice was raised (sometimes high-pitched and spoke faster) from time to time, to emphasise certain views throughout the interview. A lot of hand gestures were used to stress/emphasise issues regarding accuracy and the admissibility of the polygraph. The participant was clearly very well read and conversant, as he had clearly done considerable research on the application of polygraph. The participant's knowledge is impressive, but understandable as he has been polygraphed...a lot of frustration at the process was detected in his tone at times..." Reflections, observations, thoughts

and experiences that emerged during the process were also recorded, which supplemented the 'richness' and 'thickness' of the information during the analysis.

3.7 THEORETICAL SATURATION

Theoretical sampling ended with theoretical saturation. When saturation had been reached, sampling was stopped. This meant that the categories and their respective properties were satisfactorily dense, and the collection of further data would not spawn any further leads (Howitt, 2016:200; Charmaz, 2006:113). Data saturation may therefore be described as the stage when further information collected in a study was redundant (Howitt, 2016:201; Howitt, 2016:201; Bogdan & Biklen (2006) (as cited in Kolb, 2012:85; Charmaz, 2006:113). At some juncture during data collection, no further new categories of data or new inputs into the existing categories of data would be found, which implied that theoretical saturation had been reached. Charmaz (2006:189) and Glaser and Strauss (1967:65) therefore argued that theoretical saturation occurred when no more data was found, and properties of the category could not develop any further. As similar instances continually occurred, there was confidence that the particular category was saturated. Once a category was saturated, it meant that there was nothing left and the researcher had to move on to new groups of data, so that all the categories of data could also reach the point of saturation.

Data saturation was necessary, as this helped guarantee that adequate information had been collected in order to correctly highlight the participants' views. The last interviews in this study showed data saturation, as the data collected by this stage mainly provided accounts of concerns and issues that were already coded during earlier interviews. No new variations were developing, and so it was deduced that data saturation had been attained. As noted by Glaser (2001:191), "saturation is not seeing the same pattern over and over again. It is the conceptualisation of comparisons of these incidents, which yield different properties of the pattern until no new properties of the pattern emerge".

3.8 METHODOLOGICAL RIGOUR AND TRUSTWORTHINESS OF THE STUDY DATA

It was essential to appraise the credibility of the study, so that there was confidence in the findings. De Vos et al (2011:172) stated that at the onset of a study, it was necessary to make sure that both instruments and measurement were deemed to be reliable and valid, so that suitable data was yielded. It was further argued by Neuman (2014:212) that validity and reliability were concepts that assisted in ensuring the credibility, truthfulness or authenticity of the findings.

3.8.1 Validity

According to Neuman (2014:212), validity postulated truthfulness. Yin (2016: 88) expounded that a valid study was one that had properly interpreted the data so that the conclusions accurately reflected and represented the real world that was studied. Babbie (2017:152) explained further that “validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration”. A sample which represented the population was deemed to be valid. Instrument validity dealt with the researcher measuring what was intended to be measured with the instruments that were selected. Validity could be determined by asking whether the researcher was indeed probing that which was said was being investigated. Edmonds and Kennedy (2017:4) and Fraenkel, Wallen and Hyun (2012:148) concurred that validity also referred to the relevance, correctness, significance and utility of the interpretations that were made by researchers, which were based on the data collected, and whether a study explained what it claimed.

To ensure validity in this study, interviews were conducted with all investigators by means of an interview schedule which was used a guideline, and which was constructed around the research questions. The interviews were conducted in a neutral environment. Participants’ answers were recorded and field notes were made. The questions asked during the interviews emanated from the research questions, to ensure that the interviews were an accurate reflection of the study. Conforming to the principles of validity, it was deemed that the interview schedules measured what they were envisaged to measure. Additionally, a literature review was conducted with

regards to the research aims, the research questions and the topic. The research literature consulted comprised both national and international sources. The literature addressed different concepts relevant to the topic, and could thus be argued to be valid. Validity was further ensured by the cautious and guarded selection process of the sample and data collection.

3.8.2 Reliability

When research findings could be repeated, the study was deemed to be reliable (Cropley, 2019:27; Neuman, 2014:212). This implied that when the same research sample size was selected with the same method, repeatedly, and yielded the same results when the same instrument was used every time, the study was considered to be reliable (Cropley, 2019:27; Babbie & Benaquisto, 2010:139). Reliability could also be achieved by comparing the study to other studies carried out in related dissertations or generic research. According to Neuman (2014:218), in a qualitative study an interview schedule or questionnaires could be used as the research instrument. To guarantee reliability in this study, detailed notes and written memoranda were kept during the research process, including during the interviews. Additionally, the findings of this study could be deemed reliable because the sample consisted of trained and experienced investigators who had in-depth knowledge and experience in criminal investigations. Accordingly, the participants were in a position to contribute the required information necessary to attain reliable findings.

Finally, validity and reliability could be verified by researchers evaluating and appraising their own work, comparing documentation, and validating data by means of interviewing witnesses or well-informed and experienced people (Babbie & Mouton (2001) (as cited in De Vos et al, 2011:380). Validity and reliability were established in this study, by the researcher reading and accessing her work, the supervisor going through and critically assessing the work, and by validating the information gathered from investigators in the sample. Essentially, reliability and validity ensured that the study was trustworthy.

3.8.3 Trustworthiness of the study

Trustworthiness referred to the extent to which the findings of a study could be accepted with confidence that it accurately reflected reality (Cropley, 2019: 34). In qualitative studies, trustworthiness had to be ensured, as answers to the research questions were sought by means of different, flexible and evolving methods and processes. Unlike in quantitative studies, qualitative research did not employ standardised and structured methods and procedures to test validity and reliability.

Guba and Lincoln (1985) (as cited in Denzin & Lincoln, 1994:105-117), however, expounded four criteria as a fragment of the constructivism model that paralleled 'validity' and 'reliability' in quantitative research.

Accordingly, there were two sets of criteria, namely 'trustworthiness' and 'authenticity' "for judging the goodness or quality of an inquiry in constructivism paradigm" (Guba & Lincoln (1985) (as cited in Denzin & Lincoln, 1994:114). Authenticity referred to the "soundness" of data sources meaning that participants made an accurate representation of themselves or that documents and materials collected were produced under knowable circumstances (Yin, 2016: 86). It was also asserted by Guba and Lincoln (1985:296), that trustworthiness in a qualitative study, which was considered a fundamental standard, was decided by credibility, transferability, dependability and confirmability. Babbie and Mouton (2001:277) postulated that no study could be judged to be credible unless it was understood to be transferable, and it could not be dependable unless it was believed to be credible.

3.8.3.1 Credibility (truth value)

Credibility related to determining whether the outcomes of the study were trustworthy or authentic from the participant's viewpoint. Due the fact that a qualitative study explored peoples' beliefs, perceptions, feelings, and experiences, it was assumed that the study participants were ideally suited to decide whether their opinions and feelings were satisfactorily reflected. Credibility was therefore judged by the degree of participant agreement, which was taken to the participants for validation, congruence and endorsement. The greater the degree of the participants' agreement, the better

the validity of a study (Trochim & Donnelly (2007:149). Two methods which were advocated by Saldana (2011:135) to ensure credibility, were used in this study. The first was the citation of significant intellectuals in the discipline of polygraph, and the second involved the corroboration of the data with the participants. Additionally, credibility was further ensured due to the fact that participation in this study was voluntary, and all interviews were audio-recorded. Verbatim quotations that were used during the presentation of the findings also enabled the reader to get closer to the participants' account.

3.8.3.2 Transferability (applicability)

Liamputtong (2013:25) as well as Babbie and Mouton (2001:277) opined that transferability referred to the “generalisability” of the study. It strived to compare how much of the findings emanating from the study were related to other individuals or groups, contexts, or settings. Merriam (2009:223) stated that findings were delineated by the specific framework within which they occurred, and not on how generalisable the findings in the study could be. It was further argued by Babbie and Mouton (2001:277) that it was not the researcher who asserted knowledge from one context to another, but that the responsibility of conveying results from one setting to another was the responsibility of the reader. Chilisa (2011) (as cited in Liamputtong, 2013:25) affirmed that cautious sampling strategies and dense insightful accounts of the study setting were ways that augmented transferability.

Additionally, it was suggested by Denzin (2001:116-117) that opulent, abundant imageries generated circumstances for “interpretations and understanding” to take place. The participants who used polygraph in criminal investigations were identified from the KwaZulu-Natal Case Index Register to ensure that ‘rich’ data could be obtained during the interview process. The KwaZulu-Natal Case Index Register recorded information such as case reference numbers and the offences. From the register, the frequency of requests for polygraph examinations was determined, and the initial ten (10) participants in the sample were identified.

3.8.3.3 Consistency (dependability)

Consistency, which was comparable to the concept of reliability in quantitative studies, concentrated on whether the same outcomes would be achieved, should the researcher observe the same phenomenon a second time (Trochim & Donnelly 2007:149). Due to the fact that qualitative research advocated freedom and flexibility, it was not necessarily an easy feat achieving consistency, unless detailed and extensive records of the process were preserved. Others should be in a position to replicate it to establish the extent of dependability. Accordingly, dependability referred to whether the accounts and elucidations of the study outcomes befitted the data from which they emanated (Liamputtong, 2013:26).

The dependability of a study was enhanced when the research procedures were reliable, could be traced, and were clearly documented. Consequently, it could be stated that dependability could be considered the audit trail of the study. During the course of this study, dependability involved the exploration of every step of the inquiry, which incorporated an examination to determine whether the process was applicable and pertinent. An audit trail of the original transcripts, data analysis and field notes, research journal and written memoranda were kept to promote consistency by enabling checking, verifying, validating and corroborating the accuracy of the data by the researcher.

3.8.3.4 Confirmability (neutrality)

Confirmability was akin to reliability in quantitative research, as it denoted the degree to which findings that have were generated could be substantiated or confirmed by way of other research (Trochim & Donnelly, 2001:149). Babbie and Mouton (2001:278) explained further that confirmability referred to the “degree to which the findings were products of the focus of the inquiry and not the biases of the researcher”. According to Lincoln and Guba (1985:309-310), dependability and confirmability could be determined by the use of an audit trail.

Subsequently, during this study, the different categories of data were studied to establish an audit trail, which comprised of interview recordings, written field notes,

summaries and the development of themes. Furthermore, confirmability in this study was enhanced by reflexivity. In a qualitative study, reflexivity probed the interconnected associations among experience, the social world, knowledge and research roles (King & Horrocks, 2010:125). When the qualitative approach was used, the reflection on one's own practices, as well as social, philosophical and personal prejudices, had to be guarded, as it could have an impact on the ability to collect and interpret the data (Leedy & Ormrod, 2015:274).

It was further emphasised by Roulston (2010:116) that the subjective position in which the researcher found themselves in a study, in relation to the research topic and participants, had to be acknowledged. Cognisance thereof had to be taken, as it intensified consciousness about complex and complicated relationships and interactions which could emerge during the research process.

Roulston (2010:120) outlined four strategies to demonstrate reflexivity, namely idiosyncratic statements, writing a journal, the researcher being interviewed by others, and the analysis of the researcher's data, journals and notes made in the field. During the course of this study, a research journal was kept, chronicling opinions, thoughts and ideas about potential research topics, as well as fissures in the literature and likely ways of addressing them. The ideas were then articulated into the research proposal. A journal was used to record reflections during and after interviews. The journal was also used to record questions that needed further attention or exploration. This journal assisted during the compilation of the study, as likely relationships between the data and existing literature were noted.

Notwithstanding, by undertaking to be neutral in the presentation and interpretation of the findings, researchers inexorably shared their own stances and perceptions. It was these shared views of the researcher's experiences, beliefs and personal history that enabled research findings to be more trustworthy, and which subsequently had to be accepted (Liamputtong, 2013:26).

In addition, the following additional strategies put forward by Gibbs (2007) (as cited in Creswell, 2009:190) to augment the trustworthiness of a study, were used:

- The transcripts were checked for mistakes and inaccuracies.
- It was ensured that the definition or denotation of codes did not change during the coding process. This was achieved by relentlessly comparing the data with

the codes and by compiling memorandums regarding the codes and their meanings.

3.9 DATA ANALYSIS

Data analysis could be described as the systematic procedure during which the views of participants were grouped together to establish significant findings within a group of collected data (Quinlan et al, 2015:395). Qualitative data analysis was, according to Babbie (2017:494), the non-numeric probe and interpretation of observations with the intention to discover fundamental meanings and patterns of relationships. In this study, the computer programme Atlas.ti Version 8 was used to analyse the data using the thematic approach by grounding data into themes and sub-themes.

3.9.1 Atlas.ti

Atlas.ti was a computer programme for a qualitative study. The programme tracked all data by keeping track of the trajectories to the source documents. Codes, code groups and network views that were developed, were stored. All data files were copied and kept in a repository. The programme further managed all documentation for the researcher in its in-house databank. Source documents may be comprised of interview transcripts, articles and reports, images, audio-recordings, video excerpts and PDF files. When different documents were added or linked to the programme, coding of the various data sources could be initiated. Coding was described as the task in which the researcher was involved when using Atlas.ti, as it was the foundation of everything that was done. On a practical level, coding was a way of allocating categories, concepts or 'codes' to pieces of data that were relevant to the goals of the study. In essence, Atlas.ti provided tools in order to handle, remove, relate, discover and reconstruct significant sections from large quantities of data in innovative, pliable yet methodical ways (Frieze, 2018:9-11).

3.9.2 Thematic approach

A thematic approach was used in this study. Bryman and Bell (2015:429) described a theme as a category that was identified in the data. A theme related to the focus of the

study and, to a certain extent, the research questions. It was constructed around codes that were found in the interview transcriptions or field notes. Themes provided the foundation for an abstract understanding of the data that could make an academic contribution to the literature relevant to the study.

According to Bryman and Bell (2015:428), the intention was to create a directory of central themes and sub-themes, which was presented in a matrix. The themes and sub-themes were recurring topics or issues in the transcripts. Themes and sub-themes were recognised by a comprehensive and in-depth appraisal of the transcriptions. This structure was then applied to the data, which was organised into main themes. Thereafter, the data was presented by way of sub-themes within a matrix for respective cases.

In order to effectively determine and identify the themes and sub-themes, Saunders et al (2016:580) suggested that there must be familiarity with the data. The researcher in this study was familiar with the data, as all interviews were personally transcribed. Coding of the data took place using the computer software programme Atlas.ti Version 8. As proposed by Saunders et al (2016:580), themes were sought by attempting to make sense of the data by probing for patterns and relationships. Thereafter, the themes were refined, as it was required to be part of a comprehensible set to ensure a properly structured analytical framework in order to continue with the analysis. As themes developed, the coded data excerpts had to be reorganised under the relevant themes and/or sub-themes. Initial themes could be combined to create a new theme, others could be separated into different themes, and some could be discarded.

Table 3.1 provides an overview of the themes and sub-themes that developed during data analysis:

Table 3.1: Themes and sub-themes generated from the data.

Themes	Sub-themes
1. Experience as an IO in the SAPS	<ul style="list-style-type: none">• Types of cases investigated• Resources used in solving cases
2. Use of polygraph in the SAPS	<ul style="list-style-type: none">• Experience of IOs using polygraph• Frequency of polygraph application• Types and profiles of cases for which polygraph is used
3. Impact of polygraph in solving cases	<ul style="list-style-type: none">• Positive impact of polygraph• Examples cited of the positive impact of polygraph• Negative impact of polygraph
4. Sustainability of polygraph in the SAPS	Concerns and issues regarding the use of polygraph
5. Non-users of polygraph	<ul style="list-style-type: none">• Awareness about polygraph• Awareness of polygraph within the SAPS• Reasons for never using polygraph
6. Better understanding of polygraph for non-users	<ul style="list-style-type: none">• Use of polygraph as aid/tool for non-users

Grounded theory was not only a process encompassing the collection of data, but was also a means of data analysis. This approach did not need any specific sort of data. Grounded theory was suitable for interviews, media content, biographical data,

conversations, observations or anything else that essentially informed the theory that was developing. A fundamental requirement, however, was that the primary data was as rich as possible (Howitt & Cramer, 2014:391). Charmaz (1995) (as cited in Howitt & Cramer, 2014:391) submitted that data that had a lot of information enabled 'full' or 'thick' transcribed accounts. There was general acceptance that the fundamental components of comparison, coding, categorisation and memorandum writing, which were summarised broadly as grounded theory, were embraced in this study as described in the ensuing sections.

3.9.3 Comparison

Guest, Namey and Mitchell (2013:13) opined that "constant comparison methods" were a significant feature of grounded theory. When done decorously, all parts of the text were methodically associated and juxtaposed with one another. Theoretical models were generated and constantly reviewed as data was gradually gathered and analysed. Howitt and Cramer (2014:392) advocated that the development of grounded theory consisted of constant comparison during every stage of data collection and data analysis processes. The data had to compare categories with each other and with the data, or else the categories could not evolve and be further developed, therefore –

- Participants could be contrasted by way of what they said or did or how they were accountable for events or actions.
- What an individual did or said in one setting could be compared with what was said and done in another setting.
- What participants did and said at a particular time was compared to what they could have done or said in a similar situation at a different time.
- Comparisons of information with the category suggested by the researcher could account for the data.
- Categories were compared with other categories during the analysis process.

Consequently, in grounded theory, categories were transformed and attuned to fit the data. This was, in the main, referred to as the method of constant comparisons, which was consistently used in this study. All new data was analysed and compared to data that was collected previously. For example, some participants referred to polygraph being "questionable in court"; this was changed to "inadmissible in court".

3.9.4 Coding and categorisation

Qualitative coding was the initial analytical step that described what the data was about. Coding entailed identifying sections of data with an indicator that concurrently classified, précised and accounted for all the data, meaning that coding was about making analytical interpretations (Bryant, 2017: 119; Leavy 2017: 151; Charmaz, 2006:43). In grounded theory, Charmaz (2006:44) postulated that coding sketched a methodical outline from which analysis occurred. It was the fundamental linkage between the collection of data and nascent theory that provided an explanation of the data. Through coding, the data was defined and its meaning analysed. The codes, therefore, converged as the foundations of an emerging theory that explained the data and guided the data gathering process further (Charmaz, 2006:46).

In this study, the 'type of cases investigated' and 'resources utilised to solve cases' were classified under the theme 'Experience as an IO in the SAPS'. 'Findings where polygraph had a positive impact', 'examples cited of the positive impact of polygraph' and 'findings where polygraph had a negative impact' were categorised into the theme, 'Impact of polygraph in solving cases'.

Grounded theory principles demanded that the data was constantly examined closely. At some stage each line of data was numbered, in order to facilitate comparison and referencing. The preliminary phase of the analysis consisted of coding – in other words, the data was described sentence by sentence. Each line was studied, and a description was assigned, describing what was happening or represented by that particular line (Howitt, 2016:199-200; Howitt & Cramer, 2014:392). This, in other words, denoted that a name (or code) was allocated to each line of data, which should emerge out of what was in that particular line of data. The purpose of coding was thus to ensure that the focus of the data was not lost during the analysis.

The names allocated to the data could also be derived from insight that emanated during the analysis of terms that could illustrate and classify a group of codes. For instance, in this study, a participant was quoted as saying "*I investigate trio crimes, which is carjackings, house robberies and business robberies... (carjacking, house robbery, business robbery)*". *In a few cases, I have used the polygraph. So I use*

polygraph, ballistics... I once used photo, I mean image analysis. We use it to help us to gather evidence to build a case" (polygraph, ballistics, photo/image analysis). The response from the participant was coded in yellow as highlighted.

In grounded theory, according to Strauss and Corbin (1998:55-143), it was common to speak of three levels of coding or categorisation, which were applied in this study. Initial coding, which was also known as open coding, referred to the process of identification and categorisation by means of a close and thorough analysis of the data. Data was crushed into discrete quantities, which were compared and questioned with "what, where, how, when and why" (Smit, 2002:69). In other words, during open coding the data was fractured into concepts and categories and then compared. Comparable incidents were clustered and given the same conceptual label.

In this study, during some interviews participants referred to polygraph being "inaccurate", "not accurate", "not accurate in terms of results" and "not very accurate". This was changed to refer to 'accuracy of polygraph'. The combination of concepts at a higher and more abstract level is known as categorisation. At this point, labels were allotted to the segments of texts. In other words, it could be argued that coding "represents the operations by which data are broken down, conceptualised, and put back together in new ways. It was the central process by which theories were built from data" (Strauss & Corbin, 1998:120-121).

Concepts which emanated from labelling and categorising crafted the rudimentary building blocks in the construction of grounded theory. Strauss and Corbin (1998:120-121) suggested that initial coding occurred line by line, which consumed a lot of time, but was most generative. In this study, the data was coded line by line so that categories could be generated. The line-by-line analysis which involved the coding of words, sentences and paragraphs, was done to generate initial codes – as reflected in a laconic example from an interview: "*I investigate all types of cases ranging from murder, attempted murder, thefts, and housebreakings ...* (murder, attempted murder, thefts, housebreakings). *I do regularly use the forensic service units such as ballistics, DNA, fingerprints ... and I and some of my colleagues at the station have from time to time used the polygraph"* (ballistics, DNA, fingerprints, polygraph). Transcripts were read and analysed, and codes were allocated to words, phrases or sentences

(highlighted in yellow) that encapsulated meaning from the data that enabled the discovery of relationships among the categories. The first sentence was categorised into Theme One: 'Experience as an IO in the SAPS', sub-theme 'Types of cases investigated'. The second sentence was also categorised into Theme One, but under the sub-theme 'Resources utilised in solving cases'.

The second level was known as axial coding. It related to a process of determining the relationships between the categories of codes (Howitt & Cramer, 2014:394). Axial coding was a systematic process whereby fragments of data, identified and separated during the open coding phase, were reorganised in novel ways so that associations could be made between categories or codes. According to Strauss and Corbin (1998:124), axial coding focused on the way that categories materialised and linked. Categories connected to sub-categories created further defined and comprehensive accounts of the subject matter. During the process of coding, a category denoted a phenomenon – which could be an issue, an event or a problem identified by participants as being important. Textual information provided indications as to whether categories were related. Texts which were transformed into concepts, were analysed by way of the genuine words used by the participants and by the conceptualisation of these words by the researcher. During the analysis of the raw data, relationships were not always be obvious. Relationships between categories were either be understated, implied or concealed. It was, for that reason, advantageous to use a structure or model to decipher and organise emerging linkages.

During this phase in the study, codes identified during the initial coding stage were grouped into ideas with similar traits, to form the first sub-categories. The main features of these sub-categories were reconstructed into main categories. Thereafter, relationships between different categories, and disparities among them, were identified. As the process of coding continued, the codes reflected two contrasting and fundamental viewpoints, namely that IOs who used polygraph saw it as a beneficial investigative aid that had merit, despite reservations regarding the inadmissibility of polygraph in legal proceedings in South Africa. On the other hand, IOs who did not use polygraph in any investigations were adamant that as long as there was no legislation and/or clear directives on the admissibility of polygraph in a criminal court,

it was neither a worthwhile nor feasible investigative aid that could be of use or value in criminal investigations.

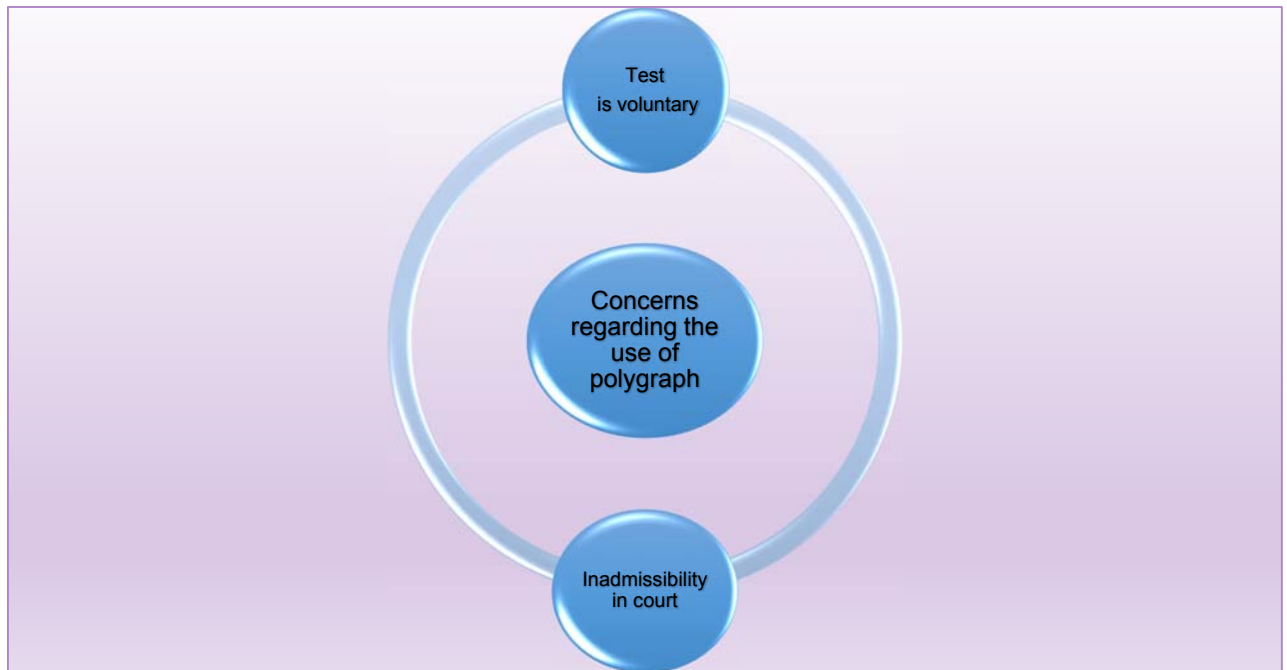
Finally, the third level was selective coding, which decided what the overall theme of the analysis was (Howitt & Cramer, 2014:394). Strauss and Corbin (1998:143) advanced that selective coding relates to the way a principle category was selected, and other categories were then related to it. This, therefore, concluded the integrating and refining of categories. Table 3.2 illustrates the process of selecting a principle category and then relating other categories to it.

Table: 3.2 Process of selecting a principle category and then relating other categories to it.

Impact of polygraph in solving Cases	<ul style="list-style-type: none">• Positive impact of polygraph• Examples cited of the positive impact of polygraph• Negative impact of polygraph
Non-users of polygraph	<ul style="list-style-type: none">• Awareness about polygraph• Awareness of polygraph within the SAPS• Reasons for never using polygraph

In this study, this stage, which involved finding the link between the main categories and reporting the narrative grounded in the data, was accomplished through sorting the memoranda, and comparing different categories and sub-categories to illustrate patterns and associations among them, as reflected in Figure 3.1.

Figure 3.1: A diagrammatic presentation showing a linkage between the main category and reporting the narrative.



As a final point, Charmaz (2006:186-187) recapitulated that in contrast to quantitative studies, there were no predetermined categories or codes to accumulate data. Codes were created by describing what was seen and obtained from the data. The codes that developed as the data was studied and analysed could take a study to unexpected areas and research questions as the information was pursued. This was because the study did not follow previously designed research problems that lead to an impasse. Following the process of coding, the codes must be organised. The first step in developing a theory was the analysis of the codes. During grounded theory analysis, codes were the smallest formal units. The analysis begins with the codes and worked towards the bigger abstract descriptions. The succeeding phase was to construct the codes into categories. Constant comparison was critical throughout the process. The analysis had to essentially compare as many of the codes as possible with other codes (Howitt & Cramer, 2014:393-394).

3.10 Memorandum writing

The critical transitional phase between data collection and the compilation of the report was known as memorandum writing. In grounded theory, memorandum writing was a vital technique, as it stimulated the analysis of the data and coding early in the research process. When memoranda were written, the grounded theorist stopped and analysed their ideas regarding the codes and emerging categories in any manner that it came to them (Thornberg & Charmaz, 2014:163; Charmaz, 2006:188). Punch (1998:206-208) explicated that the writing of memoranda assisted with deliberating, making decisions or interpretation during the data analysis process. It was therefore beneficial to engage in memorandum writing throughout the process of data analysis by recording insightful notes regarding what was being learnt from the data.

During the study, memoranda were handwritten whenever there was inspiration of thoughts or ideas; and to highlight recurring themes that were conspicuous in the data. No specific format was followed, as it was written in a fluid manner, as Thornberg and Charmaz (2014: 163) and Charmaz (2006:80) reasoned that memorandum writing should be a natural process. Memorandum writing described the way information was explored, instead of it being described and categorised. A memorandum could be a sketchbook. Proposals as to how the categories could be associated, their relationship and their interdependencies were noted in the sketchbook. The memoranda should not be entirely separate from the data (Howitt & Cramer, 2014:394).

Howitt and Cramer (2014:395) added that a memorandum could be used as an audit trail and proof of recording the process for generating the grounded theory, by enabling the conceptualisation of boundaries and properties of each category, as well as illuminating gaps in the emerging theory. In this study, upon the completion of every interview, a memorandum was written enabling reflection on the interview process. Memoranda were compiled to oversee the data collection and analysis process, and to monitor progress and challenges being encountered during the research process.

Essentially, the memorandum-writing process was important in the study, because it was used to encapsulate ideas and identify recurring themes identified in the data. In this particular study, a recurring theme to emerge related to the inadmissibility of

polygraph in legal proceedings. Notes made during the interviews contributed towards the compilation of memoranda. The memoranda, together with the interviews, later assisted to identify themes and sub-themes. As stated by Holton (2008:85), reading literature, and sorting and writing, also generated memoranda, which were also done in this study.

3.11 THE RESEARCHER AS AN INSTRUMENT

A qualitative researcher was both an analyst and a research instrument (Yin, 2016:130 & Tuckman, 1994:369). The qualitative researcher was actively involved on site and interacting with the participants by means of collecting and evaluating data (Yin, 2016:40). Saldana (2011:26) acknowledged that although there were no uniform approaches regarding the analysis of the data in a qualitative study, it was advisable that data was structured and amalgamated into an efficient and comprehensible presentation.

According to Yin (2016:130) and Creswell and Clark (2007:31), a researcher was strategically positioned in the study to point out any preconceived notions, as well as identify how background and experiences delineated the way the findings were interpreted. The interactions and experiences as a polygraph examiner in the SAPS fortified the coding and the development of themes during the analysis and interpretation of the data collected in this study. Yin (2016:130) and Neuman (2014:453) also pointed out that a researcher was an instrument measuring data in the field. The researcher in this study was consequently alert, sensitive, objective and disciplined during the process of recording the data.

3.12 THEORETICAL SENSITIVITY

In grounded theory, theoretical sensitivity was an essential feature in the study. It was accepted by Strauss and Corbin (1990:51) that researchers had life experience and knowledge that were linked to literature, and therefore emphasised the significance of recognising and applying that knowledge to augment theoretical sensitivity, stimulate questions pertinent to the research, and guide theoretical sampling. Strauss and Corbin (1994:277) added that researchers should start conducting a study with a clear

mind, but “carry into their research the sensitising possibility of their training, reading and research experience, as well as explicit theories that might be useful if played against systematically gathered data.” Theoretical sensitivity was critical for the researcher, in order to distinguish the inconspicuous gradations and meanings in the data. Hence, what was already known to the researcher was used to stimulate how the data was understood. The researcher in this study, was at one time an IO, and could therefore, due to experience, knowledge and training in the field, relate to the use and non-use of polygraph in a criminal investigation.

Cossy (2014:62) indicated that theoretical sensitivity was augmented through various sources, including an assessment of available existing literature which afforded further insight and background information on the subject matter. It was also asserted by Strauss and Corbin (1990:51) that life experience and knowledge relating to literature is brought into a study. It was therefore imperative to take note that knowledge gained from literature could augment theoretical sensitivity, stimulate research questions and guide theoretical sampling. Before a study commenced, the literature could help in the formulation of questions that could direct initial observations and interviews and inspire questions about what was happening during the data analysis process (Strauss & Corbin, 1998:45; Corbin & Strauss, 1990:51).

Preceding the initiation of this study, a general literature review was conducted. As informed by Calman (2006:np), the purpose of the general literature review was to enlighten, and not direct, the data analysis. It was cautioned by Giles, King and De Lacey (2013:E36) that although the reviewing of literature could enhance sensitivity, it must be ensured that themes and categories from the literature were actually present in the data collected from the study, to prevent imposing pre-existing ideas and theories. This also ensured that the possibility of being biased as a result of the literature, was avoided.

As recommended by Corbin and Strauss (2008:80), during the analysis process, theoretical sensitivity was also increased by waving the “red flag”, which referred to being aware that prejudices, expectations or opinions could influence the analysis. It could thus be summed up that researchers were what they had experienced, and consequently, theoretical sensitivity recognised this and took cognisance of it during

the study process. As the analyst becomes engrossed in the information collected, the level of theoretical sensitivity to logical prospects also increased. As pointed out by Quinlan et al (2015:248), data gathered for the research project was filtered through their perceptions of the subject matter under investigation, as well as through engagement with, and experience of, the issue under investigation.

During the study, the researcher conscientiously undertook separating the participants' views from her personal voice (views) as she was always cognisant of the fact that preconceptions needed to be avoided. As emphasised by Quinlan et al (2015:248), in the grounded theory approach, "theory is discovered in the data", so this study was approached with an open mind.

3.13 ETHICAL MEASURES

All research, irrespective of the discipline, had to be conducted within the realms of acceptable behaviour and practice. Research ethics were about adhering to a code of conduct relative to the individuals who were the subject of the study, or were affected by it (Anderson, 2013:128). Any study had the potential to become sensitive, due to factors beyond the control of the researcher, as there were arrays of probable issues that could have ethical implications in just about all research studies that involve people, be it directly or indirectly. It was asserted by Leavy (2017:24) and Neuman (2014:145) that ethics encompassed truthfulness, fairness, integrity and morality. Consequently, morality relates to knowing what was right and wrong while integrity involved acting on that knowledge.

Davies et al (2011:283) advanced that ethics were canons that should be adhered towards others when research was being conducted. Simply stated, ethics were guidelines as to how a researcher should behave during the research process. It could therefore be argued that ethics during the research process should be an important consideration when planning, designing, implementing and communicating research findings that involved people. It was thus vital that researchers were sensitised to what was right or wrong, and acceptable or not acceptable during the research process, because the onus was upon them to treat the study participants in a moral and dignified way at all times.

Wincap (2017:46) maintained that a code of ethics could be described as the professional standards by which a researcher had to abide. This was to ensure that a study was of a high standard, with a strong methodology, that fulfilled obligations to both the participants and other academics in the field. Ethics were also fundamental in ensuring that the well-being, sensitivities and privacy of all participants were protected.

Saunders et al (2013:43) also supported the notion that all participants in a study had ethical privileges, which consisted of the right to be consulted, to give or refuse to give permission, as well as the right to privacy. Researchers could extensively probe participants, or access personal information of people and/or organisations. Consequently, there was always the possibility that information elicited would be compromising to either an individual or an establishment. It was for this reason that mutual trust between the researcher and the participants should exist.

This study took cognisance of, and adhered to, the following ethical considerations:

3.13.1 Approval

Authorisation to carry out the research from the SAPS (refer to Appendix "A", and to Annexure "B" for proof of permission) and from the Ethical Committee at the University of South Africa (Unisa) (refer to Appendix "C" for the ethical clearance certificate), were acquired at the onset of the study.

3.13.2 Informed consent

According to Cropley (2019:76), Yin (2016: 49) and Tracy (2013:89), consent was about a covenant between the participant and the researcher, implying participation in the study. It was not just a simple agreement that was required, but informed consent was needed. Likely participants had understand what they assenting to: Informed consent denoted that a participant was participating voluntarily in the empirical investigation after having taken into account any possible risks and benefits of the study. As advocated by Leavy (2017: 33), Neuman (2014:151) and Thomas (2013:49), the following information was communicated to the participants at the onset:

- The nature and purpose of the research, including its methods;
- The expected benefits of the study was explained to the participants;
- Information regarding confidentiality, anonymity, the preservation of the data and the duration for which it was to be retained, as well as details of when the data would be destroyed;
- The ethical procedures that were followed by the researcher;
- The researcher's full names and contact details; and
- Participant were not pressurised, unduly influenced or intimidated to participate in the study, as the decision was ultimately their own.

Additionally, it was communicated to the participants in this study that the research was being conducted by a postgraduate masters student, in the field of criminology. Subsequently, after all pertinent details of the study were fully understood, the participants made a cognisant decision to voluntarily participate. An assent form indicating their willingness to participate was signed (see Appendix "D").

3.13.3 Anonymity, confidentiality and privacy

Confidentiality was the agreement between the participant and researcher regarding what may happen with the data, while anonymity was the absence of information that identified a participant in a study (Huberman, Miles & Saldana, 2014:63). All information that was given by the participants should always be regarded as confidential, taking care at all times not to breach or compromise that confidentiality. Maintaining the anonymity of the participants was very important in a study regarding interactions as well as conversations with others, and also when it came to the storage of data and reporting (Thomas, 2013:47).

Cropley (2019: 75) and Liamputtong (2013:41) concurred that the purpose of confidentiality was to obscure the participants' true identity so that their views were not exposed to others in a way that they would be recognised. Anonymity could be ensured by changing the names of the participants as well as the name of any institutions to which they were affiliated and the regions in which they were situated. A pseudonym or code numbers could be given to achieve this. Where appropriate, it should be made clear to participants that commitment to confidentiality as a researcher

may be overruled, given one's legal or moral duty to report incidents of harm (Thomas, 2013:48).

In this study, all participants were guaranteed confidentiality and anonymity by affirming that their identities and the stations at which they worked were not revealed or cited. Nom de plumes for both the participants and the stations were used. All through the study, the privacy of the participants were protected, as they were assured that their identity would remain anonymous. Data collected was safely stowed in a password-protected computer which was only accessible to the researcher. Furthermore, as information in certain investigations was sensitive, confidentiality in respect of any and all criminal investigations discussed were also ensured.

3.13.4 Avoidance of deception

During a study, deception could ensue when research was carried out secretly, or when a researcher assumed a fabricated character or identity, or when participants were intentionally misinformed (Cropley, 2019:76; Neuman, 2014:151). In this study, all facets of the study were communicated to all the individuals who participated in the study – in that way eradicating any deceit on the part of the researcher. Prior to any interview with any participant, the details of the covenant of informed consent was communicated. In spite of formal acceptance of the agreement, participants were also afforded the option to refuse to answer any questions, or to withdraw at any time from the study.

3.14 DATA PROTECTION

All data gathered had to be stored in a protected location, because it related to individuals who could be identified. The gathered data could only be used for the purposes for which it was obtained and not for any other purposes, and should be kept for an appropriate time period, with secure passwords, on files that contained pre-anonymised names. The data should not be distributed to anyone else, as it should be kept anonymous (Thomas, 2013:48). All the data collected in this study was stored electronically and as a manuscript. Once permission was obtained from the participants, every interview conducted was audio-recorded and transferred to a

computer storage programme. Thereafter, the audio-recordings were transcribed verbatim and stored electronically. All records pertaining to permission, requests and participant consent were printed and filed.

3.15 SUMMARY

In this chapter, the research design implemented in the empirical part of the study, was presented. The practical methods employed to answer the main research question, namely "What are the perceptions and experiences of SAPS investigators regarding polygraph as a diagnostic tool in criminal investigations in the South African context?" were highlighted. An account of the research plan, the ethical processes used to ensure trustworthiness, as well as a narrative of the data collection and analysis which centred on the grounded theory approach, were consequently delineated in this chapter.

The research design, which was referred to as the plan, was an exploratory study. It was reasoned to be appropriate, as the topic was relatively novel. It was therefore envisaged that the findings and insight emanating from the study could possibly lead to, and encourage, further research in the field. The qualitative approach was selected, as it made it possible to understand the underlying reasons, opinions and motivations regarding the subject matter. It was also intended to appreciate the context and discipline of polygraph, predominantly within the law enforcement environment, as there was a dearth of research regarding the application of polygraph within the law enforcement community in South Africa and this approach was therefore deemed ideal for this particular topic. Additionally, it was also considered to be beneficial to listen to, and gain insight into, the participants' perceptions and experiences, in order to attain a comprehensive understanding of their experiences and views in their own words.

The grounded theory methodology was intentionally selected, as it was useful when it came to investigating issues of 'how' and 'why' in a disciplined way, based on what was evident in the data. It was also envisioned that by using the grounded theory approach, the findings would assist in determining whether polygraph, as a diagnostic aid in criminal investigations, was beneficial and viable in criminal investigations within the SAPS.

In this study, the initial data collection was guided by an open general research question related to an IO's experience regarding the application of polygraph in criminal investigations. Data was collected by way of documents and semi-structured interviews. It was concurrently followed by the analysis of the data. The initial study comprised ten (10) participants who were investigators in the SAPS, identified from the Case Record Index Register in the Polygraph Section in KwaZulu-Natal. The findings from this initial sample directed the study that gave further insight into issues that emerged from the data. Theoretical sampling began after the analysis of the first ten interviews. The analyses then led to the sampling of non-users of polygraph, to ascertain why the majority of investigators were not using the polygraph, even though some of their colleagues were doing so.

The computer programme Atlas.ti Version 8 was used to analyse the collected data, using a thematic approach by grounding data into themes and sub-themes. Ascending from the data analysis process, nine themes, which were analysed and discussed in the next chapter, were identified. In essence, the fundamental components of grounded theory, namely comparison, coding, categorisation, memorandum writing, theoretical saturation and theoretical sensitivity, were encompassed in the study. In addition, validity and reliability ensured the trustworthiness of the study by addressing credibility, transferability, consistency and conformability. Throughout the process, the researcher positioned herself to take cognisance of and recognise biases and how personal experiences and background could have impacted on how the data was interpreted, as it was vital to recognise one's own beliefs and attitudes by reporting findings objectively. Finally, ethical measures that played a vital role in a study were adhered to, to ensure that there were reciprocated trust between the participants and the researcher.

In the ensuing chapter, discussions of the empirical investigation are presented with the findings deliberated and inferred in relation to the theoretical framework of the study.

Chapter 4

STUDY FINDINGS AND DISCUSSION

4.1 INTRODUCTION

The preceding chapter presented the research design used in the empirical phase of this study to answer the main research question. Additionally, methods used to collect and analyse the data were also outlined. The current chapter presents the data that was derived from the interviews, and important themes that addressed the significant questions of this study are correspondingly discussed.

The study intended to determine the extent to which polygraph is being (and has been) used as an investigative aid in criminal cases that are investigated by investigators within the SAPS. The main research question was to unearth the perceptions and experiences of SAPS investigators regarding polygraph as a diagnostic tool in criminal investigations in the context of the South African law enforcement community. The research intended to answer the following five questions:

- What is the status of the current theoretical basis of polygraph examinations internationally and in South Africa?
- What is the current status of polygraph application in the South African Criminal Justice System?
- Are polygraph examinations effectively used by SAPS investigators as an investigative tool in criminal investigations?
- Is/has polygraph been effective in solving criminal cases within the context of the SAPS?
- What are the (potential) shortcomings that have been identified with regard to the application of polygraph in criminal investigations within the SAPS context?

In an attempt to answer these questions, a literature review was undertaken to determine what germane research had revealed. It was envisioned that the study would enable a generation of understanding regarding the use of polygraph in

criminal investigations, specifically within the law enforcement environment in South Africa.

4.2 PROFILE OF THE PARTICIPANTS

The study comprised twenty (20) SAPS IOs. All participants were from KwaZulu-Natal. The ranks of the members who participated were Lieutenant Colonel, Captain, Warrant Officer, Sergeant and Constable as reflected in Table 4.1. Both males and females contributed to the study, although it should be noted that significantly more males contributed to the study.

Table 4.1: Profile of the study participants

Participants	Gender	Rank
1	Male	Warrant officer
2	Male	Constable
3	Male	Warrant officer
4	Male	Sergeant
5	Male	Warrant officer
6	Male	Captain
7	Female	Sergeant
8	Male	Sergeant
9	Male	Constable
10	Male	Captain
11	Male	Constable
12	Female	Warrant officer
13	Male	Lieutenant Colonel
14	Male	Lieutenant Colonel
15	Female	Warrant officer
16	Female	Captain
17	Female	Constable
18	Male	Constable
19	Male	Warrant officer
20	Male	Sergeant

4.3 CENTRAL THEMES OF THE STUDY

The grounded theory methodology, which was an inductive crime and justice theory that was frequently used in qualitative research to build towards abstract theory by making comparisons of ground-level empirical observations, was adopted. A thematic approach, which was discussed in Chapter 3, was used. Data emanating from the study was analysed, and then classified into themes and sub-themes. In thematic analysis, themes and patterns are identified in qualitative data for further analysis (Saunders et al, 2016:79).

The researcher in this study was familiar with the data, because interview data was transcribed subsequent to each interview. Practically, once the interviews had been transcribed into text, the text was transferred to Atlas.ti computer software. The data was then categorised, which entailed the data being broken up and then rearranged in a new way. As submitted by Smit (2002:67), the data in this study was assigned to categories, and formal connections were identified. Classification was not unbiased, as it was done with a purpose that was steered by the goals of the study. When the classification of the data was completed, consistencies, disparities and idiosyncrasies were scrutinised to identify patterns.

With the aim of making sense of the information, themes, patterns and relationships were sought. As posited by Saunders et al (2015:78), a theme was a comprehensive classification that integrated other codes that seemed to be connected to one another, and indicated an idea that was significant to the research question. An overview of the six identified themes and sub-themes are reflected in Table 4.2.

Table 4.2: Themes and sub-themes relating to the use of polygraph in criminal investigations:

Themes	Sub-themes
1. Experience as an IO in the SAPS	<ul style="list-style-type: none"> • Types of cases investigated • Resources utilised in solving cases
2. Utilisation of polygraph in the SAPS	<ul style="list-style-type: none"> • Experience of IOs using polygraph • Frequency of polygraph application • Types and profile of cases for which polygraph is used
3. Impact of polygraph in solving Cases	<ul style="list-style-type: none"> • Positive impact of polygraph • Examples cited of the positive impact of polygraph • Negative impact of polygraph
4. Sustainability of polygraph in the SAPS	<ul style="list-style-type: none"> • Usefulness and viability of polygraph • Concerns and issues regarding the use of polygraph
5. Non-users of polygraph	<ul style="list-style-type: none"> • Awareness about polygraph • Awareness of polygraph within the SAPS • Reasons for never using polygraph
6. Better understanding of polygraph for non-users	<ul style="list-style-type: none"> • Use of polygraph as an aid/tool for non-users

The main question in this study focused on the perceptions and experiences of SAPS investigators regarding polygraph as a diagnostic tool in criminal investigations in the milieu of the South African law enforcement community. The empirical stage, therefore, began by attempting to understand the perceptions and experiences that investigators had regarding the application of polygraph. From the onset of this study, it was determined that it was important to grasp the perceptions of investigators regarding the application of polygraph. The reason was that perceptions would have

an influence on an investigator's decision about whether or not to use the polygraph in a criminal investigation.

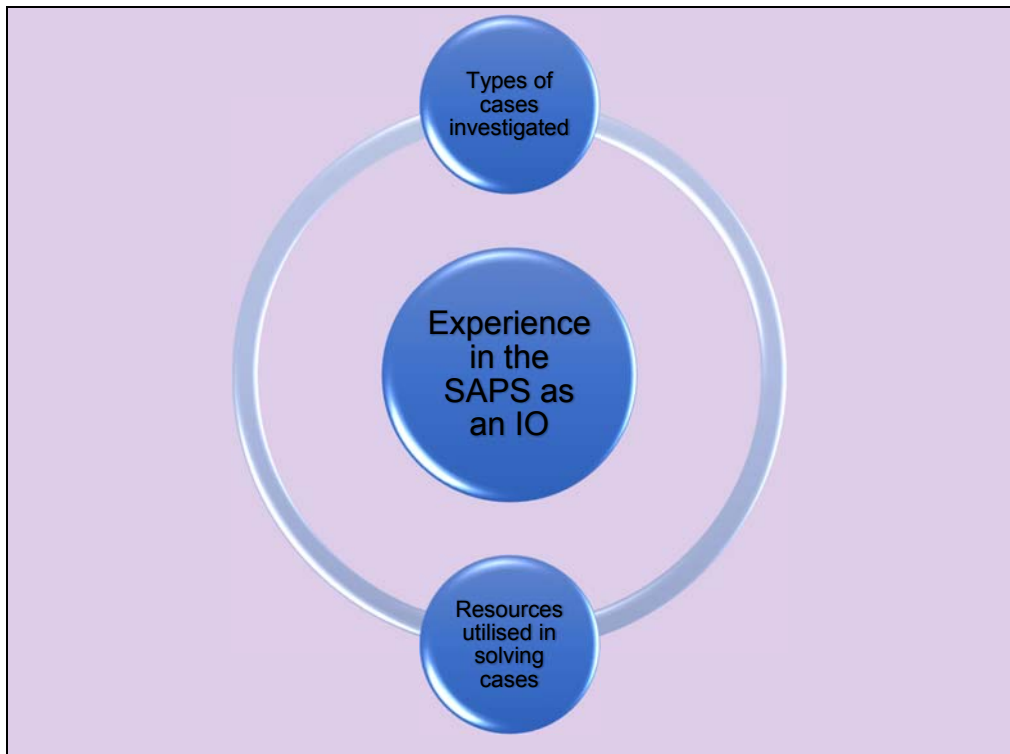
Expectations and beliefs had an impact on perceptions, because people were inclined to perceive what they expected to see, and tended not to perceive what they did not expect to see. This was due to the fact that individuals had a propensity to hold stereotyped beliefs which were typically controlled by society's perceptions, prejudices and attitudes, as was highlighted by Bartol (1983) (as cited in Venter et al, 2003:143). It was reiterated by Hale (2008:6-9) that perceptions were based on each person's view of the world around them. What one person sees or experiences was not necessarily, or always, what another person saw or experienced, because history, coupled with culture and experience, had an effect on a person's outlook on life, which influenced perceptions. It could be argued that perceptions that were individually formulated influenced the way people made decisions. Consequently, with polygraph being a controversial and provocative discipline, with proponents for and against it, there were bound to be influences regarding the decision of investigators using or not using polygraph as an investigative aid in the detection of the truth in criminal investigations.

The first theme emanating from this study, therefore, related to understanding the experiences of the participants.

4.4 EXPERIENCE AS AN IO IN THE SAPS

It was the aim of Theme One to determine the experience of each participant as an IO in the SAPS. The experiences as an IO were documented by articulating the types of cases investigated, as well as the resources used in solving cases. The diagrammatic presentation relating to experiences in the SAPS is shown in Figure 4.1.

Figure 4.1: Diagrammatic presentation of experience in the SAPS as an IO



4.4.1 Types of cases investigated

In order to build rapport and contextualize this study, all the participants were at the onset of the interview requested to highlight the type of cases they were mandated to investigate. Table 4.3 which illustrates a summary of the types of cases investigated by the IOs shows that most of the IOs interviewed were involved in the investigation of serious cases such as murder, which was mentioned by 11 participants, followed by robbery (8), attempted murder (4), house robbery (3), rape (3), business robbery (2) and carjacking (2). The investigation of theft (8), housebreaking and theft (7) and assault (6) cases also featured prominently.

Table 4.3: Summary of types of cases investigated

Sub-theme	Case	Frequency
Type of cases investigated	Murder	11
	Robbery	8
	Theft	8
	Housebreaking and theft	7
	Assault	6
	Attempted murder	4
	Fraud	3
	House robbery	3
	Inquests	3
	Rape	3
	Shoplifting	3
	Business robbery	2
	Carjacking	2
	Corruption	2
	Armed robbery	1
	Arson	1
	Drunken driving	1
	Departmental cases	1
	Drug-related offences	1
	Loss of firearm	1
	Possession of unlicensed firearms	1

In this study, all IOs interviewed were primarily based at police stations situated in the community, and they were responsible for the investigation of all reported criminal offences ranging from theft, housebreaking and theft, and assault, to serious crimes such as rape, armed robbery and murder. Understanding the types of cases that IOs in the SAPS were responsible for investigating, provided a background for

comprehending the experience of an investigator. In addition, by understanding the types of cases investigated, it could be determined what type of forensic science investigative aids IOs in the SAPS generally used, and how frequently.

4.4.2 Resources utilised to solve cases

Once an indication of the type of cases IOs in the SAPS were responsible for investigating was determined, the participants were asked about the forensic science investigative aids that were used in general to solve offences. Table 4.4 provides a summary of the forensic science investigative aids that the participants frequently used:

Table 4.4: Summary of forensic science investigative aids utilised by IOs

Sub-theme	Discipline	Frequency
Resources utilised to solve cases	Fingerprint analysis	14
	Ballistics	14
	Deoxyribonucleic Acid (DNA) analysis	13
	Polygraph	10
	Questioned documents	5
	Photo/image analysis (CCTV)	4
	Biology	3
	Chemistry	2
	Fire investigation	1

Table 4.4 reflects that fingerprint analysis (14), ballistics (14) and DNA analysis (13) were the most the most popular and frequently used forensic science investigative aids used.

4.4.2.1 Fingerprint analysis

In this study, fingerprint analysis was one of the most common and frequently requested forensic aid sort by IOs. As earlier illustrated in Table 4.3, most IOs were responsible for investigating cases related to housebreaking and theft (7), house robbery (3), business robbery (2) and armed robbery (1) which take place in a fixed location such as a house or business premises. According to the SAPS learner guide (SAPS 2009: 334), in order to establish the facts of a crime, an IO could resolve the crime by way of two sources of information, namely people and objects. People who were referred to as subjective clues included victims, witnesses and suspects who could be directly or indirectly linked to the crime scene. Objective clues which referred to objects meant physical proof and the objective explanation thereof such as circumstantial evidence or exhibits such as fingerprints at a crime scene. Consequently, fingerprint analysis were of immense value when it came to solving a wide range of offences (SAPS 2009: 335).

According to Graham (2014:80), fingerprint comparison was a forensic science discipline that relied on an idiosyncratic assessment and interpretation that was made by an examiner. Characteristics or patterns observed in a latent fingerprint impression that were identified at a scene of crime was compared to fingerprint impressions of known or identified individuals. It was affirmed by Cooper (2016:761) that when the hand (or foot) of a person came into contact with a particular surface, the ridges on their skin left a printed impression behind on the surface. Advocates of fingerprint identification made three significant assertions: firstly, it was asserted that fingerprints were distinctive and did not change with time; secondly, it could be determined by a fingerprint examiner who left prints at a crime scene; and thirdly, the identification thereof could not be disputed. It was, therefore, submitted by Cooper (2016:761) that the practice of “matching” a latent fingerprint discovered at a crime scene to the inked print of a suspect had, over the years, acquired universal acceptance.

Consequently, it was asserted by Haber and Haber (2004:6) that investigators in the police had immense confidence and belief that fingerprint evidence was adequate for a conviction of an accused. As soon as an investigator had obtained a fingerprint analysis report affirming that prints located at a crime scene were a likely match to a

possible suspect, all attention of the probe changed to obtaining evidence to prove the involvement of the suspect who had been identified. As a result, any and all other probable clues and information were disregarded, and other possible suspects were neither considered nor pursued.

4.4.2.2 Ballistics

Participants (14) highlighted the fact that ballistics was frequently used as a forensic science resource. According to the SAPS Annual Performance Plan (SAPS, 2018:28), in the 2016/2017 financial year, 17 260 firearms that had been reported lost, stolen or deemed illegal, were recovered. In addition, 760 SAPS-owned firearms were either lost or stolen, with 71 being recovered. As a result of the significant quantity of firearms recovered on an annual basis, it was plausible that ballistics was frequently used by the IOs.

Based on the Locard principle, which stated that when a person or object was in contact with another person or object, there was a cross-transfer of evidence (Nortjé & Myburgh, 2019:3; SAPS learner guide 2009:340). Similarly, it was advanced by Schwartz (2005:3) that the fundamental basis of the forensic science discipline of Firearms and Toolmark Identification (commonly referred to as ballistics) was that diverse tools left unique marks on surfaces. Firearm identification, a category of toolmark identification, dealt with the toolmarks that cartridge cases, bullets and shotshell components acquired, once fired. Comparison microscopes were used by ballistic examiners to make comparisons on ammunition mechanisms and other evidence found at a crime scene with test toolmarks that were made with tools that could have made the evidence toolmark. If determined by an examiner that the evidence and test toolmarks were satisfactorily comparable, the firearm or other tools were acknowledged as the weapon(s) used in the crime. All other possible weapons were then excluded as having made the evidence toolmark.

4.4.2.3 DNA analysis

In this study, 13 participants indicated that DNA analysis was regularly used in their investigations. In South Africa crimes committed against women and children were at

an alarmingly high level. According to the SAPS Annual Performance Plan (SAPS, 2019:41), in the 2018/2019 reporting period 193 345 and 54 786 crimes were committed against women and children respectively. Due to these disturbingly high levels of crime, DNA analysis was a pivotal investigative aid for many IOs.

DNA were molecules that made up the genetic codes of most organisms. DNA analysis studied the genetic material that could be located in physical evidence – that was, hair, semen or blood, to determine whether it was a match to DNA taken from a particular individual (Patel, Gautaman & Jangir, 2013:15). Heathfield (2013:1) concurred that DNA profiling was a process in forensic science that assisted in the identification of potential suspects. This made it one of the most regularly used type of evidence that was presented in criminal cases. Wheeler (2016:204) stated that DNA evidence was first presented in 1988 by investigators in criminal proceedings in a US court. In that murder case, DNA evidence had exonerated the original suspect and identified the actual suspect. Accordingly, it was proclaimed by Cooper (2016:758), that DNA was the “gold standard” that had elevated the benchmark as to what was scientifically acceptable for the identification of a source “to the exclusion of all others”.

It was advocated by Heathfield (2013:1) that, in South Africa, the application of DNA within the forensic environment was essentially recognised and accepted as the “gold standard” of evidence in lieu of the identification of suspects. DNA evidence by and large contributed significantly to the judicial process. The value of DNA analysis was further cited by Heathfield (2013:1) in the case of *S v SMM* 2013(2) SACR 292 (SCA) where an offender was given a life sentence for rape. The conviction and sentence were appealed by the accused. Subsequently, the appeal against the conviction was dismissed because the DNA evidence was considered ample proof that a rape was committed.

In an international study conducted by Niziolek and Gołębiewska (2018:26) to determine the perceptions of Polish judges regarding the validity of polygraph in criminal cases, the judges were asked to rate, in their opinion, how valid polygraph examinations were in comparison to other types of forensic methods. DNA analysis and ballistics received the highest ratings, with polygraph receiving the lowest rating

of all available disciplines. This underscored the high value that was placed on forensic disciplines such as ballistics and DNA analysis, both internationally and nationally.

With 1 745 385 reported cases of serious crime, 17 3405 reported crimes against women, and 44 252 reported crimes against children in the 2016/2017 reporting period (SAPS, 2018:28), it was not difficult to understand the popularity of ballistics, DNA analysis and fingerprint analysis. In South Africa, with high levels of crime experienced daily, various services and disciplines that could provide assistance in solving crime were essential.

The SAPS Annual Performance Plan of 2018/2019 (SAPS, 2018:41) outlined the purpose of Detective Services as to “enable the investigative work of the South African Police Service”, which encompassed the provision of assistance to investigators by way of forensic evidence and criminal records. Therefore, in the SAPS, there were various disciplines and services within the forensic science environment available to IOs.

Forensic Services was a fundamental component of the Criminal Justice System. Forensic scientists contributed valuable information, assisting both the investigation and prosecution of crime by way of scientific examination and analysis of physical evidence, as well as by providing insight into offender characteristics and criminal behaviour. Nowadays, forensic science disciplines were regularly relied upon by law enforcement agencies to identify and apprehend offenders, and by the judicial system to prosecute them. In the past twenty years, there have been significant advancements in forensic science as an investigative and intelligence aid for police officers. Consequently, these advances have changed the way the police conduct criminal investigations, from murder cases to complex cybercrime cases (Julian et al [11 authors], 2011:218).

Undeniably, the participants had at their disposal a wide variety of investigative aids within the forensic science environment that could be accessed to assist in investigations. Although there were a wide range of services available and used by IOs, as reflected in Table 4.4, which also included document analysis (5), photo/image analysis (CCTV) (4), biology (3), chemistry (2), fire investigation (1) and polygraph

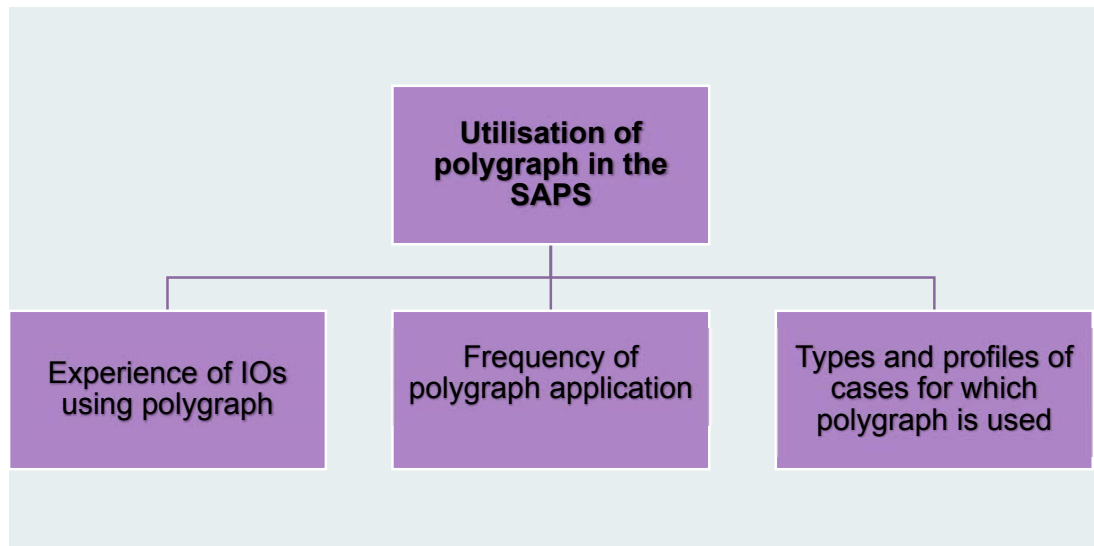
(10), it was comprehensible that fingerprint analysis, DNA analysis and ballistics featured high on the list of services that were regularly used. These disciplines, among others, played a pivotal role in court proceedings, unlike the polygraph that was essentially frowned upon, therefore making sense that investigators had regularly used fingerprint analysis, DNA analysis and ballistics.

Although the polygraph was a somewhat provocative and often misunderstood investigative tool, there were actually investigators using the polygraph in criminal investigations as highlighted in this study. The first theme therefore provided insight regarding the experiences of investigators. This was accomplished by gaining an understanding of the type of cases that were investigated, as well as an inclusive experience of investigators in terms of the type of forensic services that were generally and frequently used.

4.5 UTILISATION OF POLYGRAPH IN THE SAPS

The second theme in this study sought to determine, from the investigators, what their experiences were using polygraph as an investigative aid, and how frequently polygraph was used. In addition, the study identified the types and profiles of cases for which polygraph was used. An illustrative presentation relating to the use of polygraph in the SAPS is shown in Figure 4.2:

Figure 4.2: Illustrative presentation of utilisation of polygraph in the SAPS



4.5.1 Experience of IOs using polygraph

Participant 1 described the use of polygraph examinations in criminal investigations as “brilliant”, as the examinee wanted to make a “confession” to the polygraph examiner before the polygraph test commenced. The suspect went on to provide an explanation as to what had transpired, before reducing it to writing in the presence of the polygraph examiner.

Participants 3, 4 and 9 reflected that the use of polygraph examinations were sought as a guide – in other words, when an investigation was at an impasse and new leads or direction were needed.

Participant 5 described the experience of using polygraph as “positive”, but that, *“initially, I had serious doubts about the test and I did not believe the examiner’s results”*.

Participants 6 and 7 stated that they had “positive” experiences employing the use of polygraph examinations, as some success had ensued subsequent to its use.

It was further indicated by Participant 10 that he had “positive” experiences using the polygraph, not because he was able to solve any cases as such, but due to the fact that the complainants who had reported the cases “*were happy that I would go out of my way to conduct polygraph on possible suspects*”.

Of the participants who used polygraph in their investigations, Participant 2 and Participant 8 did not experience the use of polygraph examinations as a positive or helpful experience.

Participant 2 described using the polygraph as “unhelpful”, as he found evidence that a person who had consented to a polygraph examination, and passed, had in fact been lying in relation to being robbed of his firearm.

Participant 8 stated that the experience could not be described, and showed uneasiness about using the polygraph. He finally conceded that the only reason he used the polygraph was because “*it was just at the instruction from my commander*”.

It was fair to say that investigators who used polygraph had mixed reactions about using the polygraph. Investigators who had used the polygraph and were continuing to use it on their own initiative, in other words not because they were asked to by their commander/s, felt more positive about the polygraph experience. They were also more receptive to using polygraph as an investigative aid. The investigators who sought to use the polygraph on their own initiative as an investigative aid, used it more regularly than investigators who used it reluctantly – as is reflected in the forthcoming theme.

4.5.2 Frequency of polygraph application

Theme Two further sought to examine how often investigators made use of the polygraph. The participants were asked how often they used polygraph. This was done to ascertain the extent to which polygraph was used as an investigative aid in criminal investigations – in other words, to determine whether polygraph was being optimally used in the SAPS. Table 4.5, below, reflects the frequency that polygraph was used/or requested:

Table 4.5: Summary reflecting the frequency that polygraph was used

	Frequency with which polygraph is used	Number of participants
	Once or twice a year	4
	When needed based on the merits of a case	2
	Used when instructed	2
	Four times	1
	High profile case	1
	Used often/regularly	1
	Used when there are no leads	1

Table 4.5 reflects that polygraph was predominantly used once or twice a year by four participants, namely participants 2, 4, 5, and 7, when needed, based on the merits of a case (two participants, namely participants 3 and 6) as well as when instructed by a commander (participants 8 and 10). The other participants mentioned four times (Participant 1), in a high profile case (Participant 10), used often/regularly (Participant 9) and used when there were no leads (Participant 10).

Participant 3 reported that the polygraph was not used often, but they would use it when *“I have the need for it to help me ... if I am not sure or if I need to strengthen the version of a witness”*.

Participant 5 only resorted to the use of the polygraph *“when I feel that I really need direction in a case. Maybe once or twice a year. I use my discretion for when I want to use the polygraph. The polygraph cannot be used in every case”*.

Participant 7 used it *“once or twice a year”* because it was dependent on the type of case that was under investigation as *“polygraph is really a last resort. I mean, if you don’t have anything to link the person to a case...no DNA, fingerprints etc.”*

Participant 10 would use it when *“there were no leads in a case and the person is prepared go for the test, I will make use of the polygraph”*. It would also be used *“when it is a high profile case by that I mean that the commander has intervened”*. The

participant also emphasised that “*polygraph is not there to replace old fashioned police investigation but, to supplement the investigation...*”

It was an intention of this study to determine the extent to which polygraph was used as an investigative aid in criminal cases that were investigated by investigators within the SAPS. The findings emanating from Theme Two thus highlighted that polygraph was neither consistently nor frequently requested, and that the frequency of polygraph use was dependent on the purpose for which polygraph was being used. According to Nelson and Handler (2014:25), the fundamental purpose of a polygraph examination was to deduce whether a person was being deceptive or not. Honts (2004:103) also argued that polygraph examinations were used for a variety of reasons. In some US jurisdictions, as well as in Japan, polygraph results were admissible and used in court proceedings; therefore, the goal of such polygraph tests was evidentiary in nature. In most other countries, however, including South Africa, law enforcement agencies use the polygraph as an investigatory aid to determine the truthfulness of suspects, witnesses, complainants or informants.

Due to the fact there were no legislation, and no regulations or guidelines regarding the application of polygraph in South Africa, polygraph was used as highlighted by Krapohl (2015:66), who pointed out that polygraph examiners were generally requested to assist in cases for the following reasons:

- The investigation was at standstill, and investigators resorted to using the polygraph due to insufficient evidence, in order to determine who could be the suspect.
- The investigation had stalled, but the investigators were of the opinion that they had the correct suspect and wanted a confession.
- At times, an investigator had sufficient evidence needed for a conviction, but simply desired a confession.

Despite the fact that polygraph was used in various settings and for an assortment of reasons in many countries, the precise extent of polygraph usage worldwide was not known (Honts, 2004:103). In the milieu of the law enforcement fraternity, namely the SAPS, most participants (4) in the study used polygraph at least once or twice a year. This finding exemplifies that polygraph was optimally exploited by SAPS investigators.

4.5.3 Types and profile of cases for which polygraph was used

Once it was ascertained how often investigators used the polygraph, the investigation sought to determine the type of cases in which polygraph assistance was required. South Africa was being plagued by violent and serious crime, as reflected in the media and annual crime statistics. Understanding the type of cases for which polygraph was requested to provide assistance, enabled the study to determine whether polygraph was optimally used, and consequently qualified as a beneficial and viable forensic aid.

Column A in Table 4.6 reflects data obtained from the first ten participants in the study, who used the polygraph in their cases. Data generated during the interview process was subsequently compared with Column B (reflecting data from the Polygraph Section in KwaZulu-Natal, where polygraph examinations were requested by all investigators who had requested polygraph examinations). The data reflecting the profile of cases whereby polygraph examinations were requested was obtained from the Case Record Index registers for the period 2015 to 2017. The data presented in Table 4.6 was significant, as it afforded a synopsis of the findings emanating from the initial sample of participants interviewed. Consequently, the data from the initial sample of participants presented concurred with data collected from documentary records available at the SAPS Polygraph Section in KwaZulu-Natal.

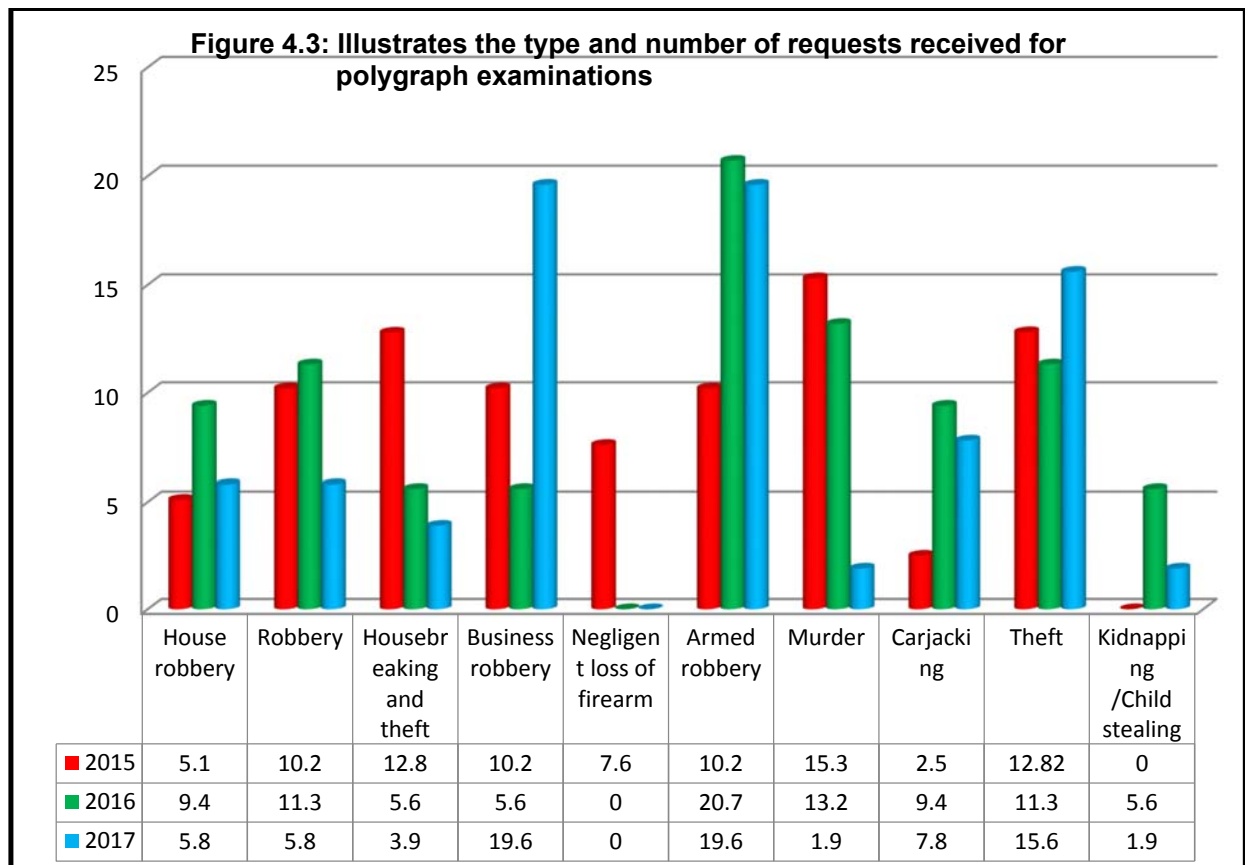
Table 4.6: Summary of cases in which a polygraph was requested

A	Data emanating from participants who used the polygraph (2015 – 2017)	B	Cases identified from applications received requesting polygraph examinations (2015 – 2017)
	Theft Business robbery Loss of firearms Murder Armed robbery House robbery Robbery Hijacking Cases involving government or municipal members/workers Housebreaking and theft Rape Sexual offences Harassment		House Robbery Robbery Theft Housebreaking and theft Business robbery Negligent loss of firearm/s Armed robbery Murder Attempted murder Stock theft Inquest Kidnapping Culpable homicide Carjacking/truckjacking Reckless and negligent driving Missing person Child stealing

Table 4.6 reflected a correlation between the overview of the offences, which were identified during the empirical phase of the study, and those that were identified in the Case Record Index registers. The data from the interviews with the participants who used polygraph reflected that polygraph was frequently and predominantly requested in cases involving theft (6), followed by business robbery (3), armed robbery (2) and housebreaking and theft (2).

A further analysis of the Case Index registers from 2015 to 2017 was conducted. The purpose of this analysis was to determine in which offences polygraph examinations

were predominantly requested. Figure 4.3 exemplifies the type and number of requests received for polygraph examinations:



The data analysis from the Case Record Index registers reflected that polygraph was predominantly used in theft and robbery cases. As illustrated in Figure 4.3, during the period 2015 to 2017, 12.82 percent, 11.3 percent and 15.6 percent of conducted cases, respectively, were for theft cases. This data corroborated the empirical data, which illustrated that six participants reported using polygraph examinations regularly in theft cases.

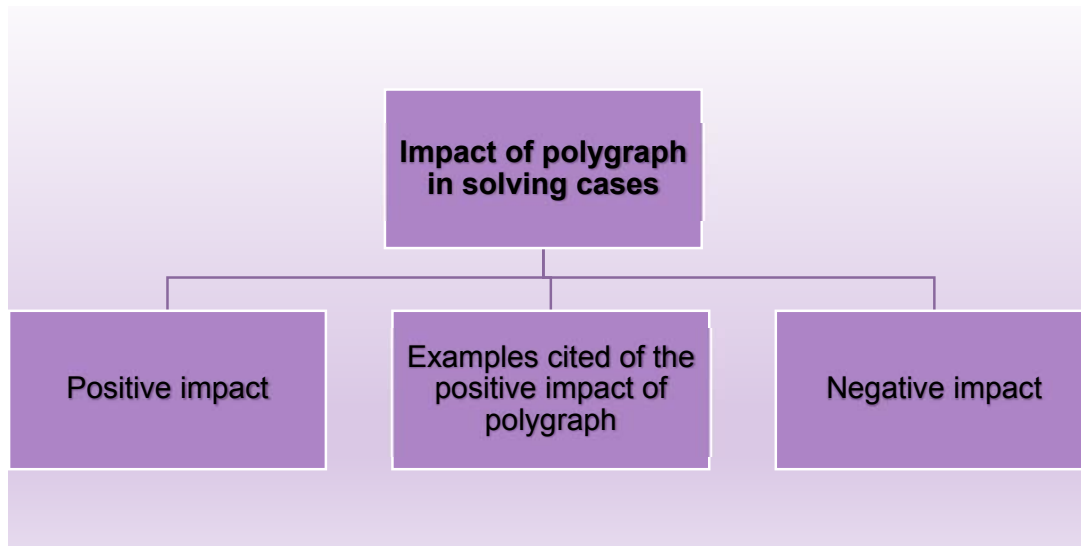
Six participants also reported using polygraph in robbery cases involving the use of firearms (armed robbery, house robbery and business robbery). These findings further concurred (as illustrated in Figure 4.3) that polygraph was generally used in cases relating to theft and robberies (be it that of a house, business, car or truck). This was further substantiated by a South African study conducted by Watson (2011:48), where it was cited, based on interviews with polygraph examiners in private practice that the

vast majority of polygraph tests conducted in Limpopo related to cases involving theft. A further analysis emanating from a review of 1000 polygraph examinations reviewed for the study, conducted by Watson (2011:70-72), found that 633 polygraph examinations had been conducted for theft-related cases and 12 were for cases relating to robberies involving the use of firearms. It could be argued that the findings illustrated by Watson (2011:48) further supported the results emanating from this study, as it was evident that polygraph was predominantly requested and used in theft-related cases.

4.6 IMPACT OF POLYGRAPH IN SOLVING CASES

The previous theme addressed the type of cases for which polygraph was requested to provide assistance, in order to determine whether polygraph was optimally used and could be regarded as a beneficial and viable forensic aid. As highlighted in Theme Two, polygraph was requested and used, albeit infrequently. It was also determined that polygraph was requested most often in theft-related cases. In the forthcoming Theme Three, the focus shifted to determining the impact that polygraph had in solving cases. In order to determine whether polygraph was effective in solving criminal cases within the context of the SAPS, the participants were asked about the impact that polygraph had in criminal investigations. A schematic presentation of the impact of polygraph is presented in Figure 4.4.

Figure 4.4: Schematic presentation of the impact of polygraph.



According to the data analysed, it could be argued the polygraph had both a positive and negative impact in assisting criminal investigations which is discussed in detail in the forthcoming sections.

4.6.1 Findings where polygraph had a positive impact

Table 4.7: Summary of findings where polygraph had a positive impact in criminal investigations.

	Positive impact of polygraph	Frequency
	Assisted in identifying false case	1
	Assisted in disciplinary cases	1
	Assisted in issues not mentioned in interview	1
	Complainant happy	1
	Confession made	1
	Confession made – avoiding polygraph	1
	Guideline determining direction of investigation	1
	Helped IO understanding people involved	1
	Incident reported correctly (statement verified)	1
	Revealed the truth	1

	Person found guilty in disciplinary (corroborating evidence)	1
	Helped identify new suspects	1
	Test resulted in further investigation with positive results	1

Table 4.7 reflects the positive impact that polygraph had in criminal cases. In order to understand how polygraph had a positive impact, participants were further requested to elaborate by citing and expounding on the positive examples or instances as to where or how polygraph had assisted in the cases as reflected in Table 4.8.

4.6.2 Examples cited of the positive impact of polygraph

Table 4.8: Summary of examples cited regarding the positive impact of polygraph.

	Cited examples	
	Suspect fired due to theft	Participant 1
	As a result of corroborating evidence, policemen dismissed due to involvement in opening false hijacking case	Participant 3
	Helped identify other suspects	Participant 4
	Correct suspect identified and arrested	Participant 5
	Assisted in revealing false case of armed robbery	Participant 6
	Uncovered police officer negligently lost his firearm	Participant 6
	False report of loss of firearm by police officer	Participant 7
	Confessed to IO in murder case after failed polygraph	Participant 9
	Polygraph provided additional/ new/ information that assisted the investigation	Participant 10

In this study, the following eight participants alluded to how polygraph had a positive impact in criminal investigations:

Participant 1 reflected that in a case where he used the polygraph, the subject had confessed to his role in the offence, to the polygraph examiner. The complainant was

happy with the outcome of the investigation and opted not to pursue the matter criminally, and subsequently withdrew the case.

Participant 3 stated that in a recent case the polygraph helped in determining the truth. The participant was quoted as saying,

“Two police officers reported that they had been hijacked of their vehicle and firearms. A car guard said that there was no hijacking and after going through and collecting evidence, I decided to get the car guard tested. I initially thought that the car guard could be involved. It was his word against the two police officers. He passed the test based on whether he was in any way involved in the robbery. In a departmental case based on my evidence and on the fact about what the carguard had said, the carguard’s story was considered a more believable version of what had happened because he passed the polygraph test. As result in the departmental, the two members were found guilty and dismissed”.

Participant 4 said that the polygraph helped him as an IO understand the people involved in an investigation:

“The polygraph element in an investigation helps the IO understand which person/s have any involvement in a certain crime that has been committed”.

Participant 5 expressed initial scepticism and reluctance when first introduced to the idea of polygraph as an investigative aid: *“When I first used the polygraph, my main suspect passed the test”*. This initially fuelled his scepticism regarding the polygraph. However, a few months later, after further investigation prompted by the fact that the “main suspect” who had initially been identified had passed, a suspect was arrested and found in possession of the some of the stolen property in his house. This resulted in a conviction and the recovery of the stolen property. Thereafter, Participant 5 said that he *“had to believe that the polygraph was right after all”*, as the polygraph examination resulted in further investigation which yielded positive results, and an innocent person was exonerated.

Participant 6 recalled that he *“really took notice of the polygraph a few years ago when I had a case where an individual reported he was robbed of his firearm in an armed robbery. I had the case for a long time and I decided to see if the polygraph would help. The individual was tested and soon after the test started, he told the examiner there was no need to do the test as he was prepared to tell the truth”*. This impressed the participant, as he was on the verge of giving up the matter.

Polygraph served as a guideline to determine whether an investigation was on the right track. Participant 7 had requested a person who had reported his firearm stolen to undergo a polygraph test. After the examinee failed the test, the IO pursued the investigation further, which resulted in a departmental hearing where the individual was found guilty of negligent loss of firearm. According to Participant 7,

“Disciplinary hearings are based on the balance of probabilities and not on beyond a reasonable doubt as in a criminal case. Polygraph is also there as a guideline, it gives me an indication if I am on the right track or not”.

Based on the experiences of Participant 9, if a person failed the test, the examinee was prepared to submit to a “plea” if they believed that they had no option, and as a result he said that it

“gives us as IOs the opportunity to realise that it is a false case”. Consequently, polygraph has helped the investigator identify false cases that were reported to the police. Participant 9 likewise discovered that failing a polygraph test, does not essentially signify that an individual committed the crime “but might be involved”, for instance “people feel their maid is involved, we will polygraph them, but we tell them that because a person failed does not mean we can arrest them. Failing does not imply that the person committed the crime, it means that there is a probability that they were involved”.

Participant 10 indicated that after a polygraph examination, the polygraph examiner had given him *“feedback about things that was not said during a statement”*. Therefore, for him, the polygraph assisted in obtaining new information during the process.

The cited examples of the positive impact of polygraph in the participants own words were supported by the literature findings presented by Damme (2001:12), Cilliers and Martin (2002:137), Sosnowski (2008a:np) and Rheeder (2012:2), who argued that polygraph examinations could be used in the following instances:

- To exclude or exonerate innocent individuals suspected to be involved in an offence.
- To rebut or confirm involvement of an individual in the commission of an offence.
- To reduce the shortcomings in an investigation with new, possible leads and clues.
- To verify whether the individual under suspicion had access to what was under investigation.
- To shed light on areas in an investigation that was of concern.
- To guide an investigation.
- To ensure a successful outcome of an investigation.
- To obtain more information.

The APA Model Policy for the Evaluation of Examinee Suitability for Polygraph Testing (APA, 2012:1), further added that a polygraph examination should be used as a decision-making support tool that added increased weight to an investigation. Polygraph examinations and their results should, however, not substitute or usurp the need for investigators making independent decisions. The following objectives, namely augmented disclosure of information, improved deterrence of problems, and increased exposure of involvement or non-involvement in criminal activities or problematic behaviours, should be considered a compelling and satisfactory reason to administer polygraph examinations.

Nelson (2014:25) not only concurred, but also reiterated that obtaining more information from a polygraph examination was a useful and important objective of polygraph. A fundamental objective of a polygraph examination was the capacity to gain information. The goal of attaining enriched and in-depth information was enhanced when a professional polygraph examiner interacted with the examinee with confidence, knowing that the person had information to disclose as was highlighted by participant 10 in the study. This knowledge could be premised on the results of the polygraph examination if the test was done by way of using standardised, evidence-based procedures that permitted the reliable classification of deception and truth

telling. Nelson (2014:25) concluded that if polygraph was used in the approved manner, it could be very effective as an investigative aid to indicate who had information that could be useful in an investigation as participants 4 and 5 highlighted in the study.

The data from the participants in this study showed that polygraph assisted in identifying false cases and suspects, eliminating innocent people from an investigation, guiding an investigation, obtaining new information or leads to pursue and sometimes could even obtain confessions. Consequently, it could be inferred that polygraph could be a useful investigative tool.

4.6.3 Findings where polygraph had a negative impact

Just as polygraph had a positive impact in criminal investigations, there were participants in the study who highlighted the negative impact polygraph had. Table 4.9 summarised the findings where polygraph had a negative impact in criminal investigations:

Table 4.9: Summary of the negative impact of polygraph

	Polygraph had a negative impact	Frequency
	Incorrect result	1
	Polygraph has not been helpful	2
	Used only because instructed by the commander	1

In the study, two participants, namely Participant 2 and Participant 8, found polygraph to be unhelpful as an investigative aid, and consequently had a negative impact on the investigation. Participant 8 alluded to the fact that the only reason that polygraph was used was due to the fact that it was an instruction from the commander, with which he was required to comply. The participant indicated that he did not gain anything that could help his investigation, from the polygraph examination.

Participant 2, who was very outspoken about the fact that the polygraph did not make a positive impact in his investigations stated that “*it never helped me*”. In a case referred for a polygraph examination, a person reported an armed robbery in which his firearm was allegedly stolen. The said individual passed the polygraph test. Sometime later, the IO, through his investigation, discovered that the individual polygraphed had in fact lied about the circumstances surrounding the case. In this particular matter, an incorrect result was obtained.

In such instances, it could be deemed that polygraph was unable to positively contribute to the investigation and was therefore seen by the participant as having had a negative impact. It was no secret that polygraph was not one hundred percent accurate. As stated by Nelson (2016:74), the results of polygraph examinations, similar to all test results, were not, and could not be expected to be perfect. Without a doubt, there was a lot of debate regarding the error rate in polygraph, which could explain the negative experience of Participant 2. According to Nelson (2016:74), in polygraph the error rate was regarded as the magnitude to which an examinee provided an answer that was not deceptive and the polygraph examiner classified it as deception (false positive). On the other hand, an examinee who was classified as deceptive could in fact had been telling the truth (false negative). Due to this, it was imperative to note that there were several elements that could have had an influence on the outcome of the polygraph test.

McManus (2008:75), Yount (2007:95) and Russell and Coetzee (2000:73) outlined the following causes that could have a negative impact on polygraph examinations:

- A polygraph examiner did not use a validated polygraph technique with a valid scoring technique.
- The polygraph examiner did not follow the correct testing procedures.
- The quality of work by the polygraph examiner was questionable.
- An examinee's emotional state prior to the polygraph examination.
- An examinee's pre-existing medical conditions.
- The polygraph examiner did not compile appropriate questions that were relevant to the facts of the investigation.
- The data collected during the polygraph examination was not decorously analysed by the polygraph examiner.

- The examinee deliberately tried to mislead the polygraph examiner during the polygraph examination.

Raskin (2015:27) posited that one of the major deficiencies of polygraph examinations was a dearth of adequate training of polygraph examiners in physiology, psychology and scientific methodology. It was also asserted by Herbig (2018:63) that many polygraph examiners were not aware of the basic principles of interviewing techniques to establish the most appropriate and conducive psychological atmosphere for each examinee, the complexities and intricacies of formulating questions, and their introduction to the subject. In addition, the administration of the polygraph examination could be deficient. The lack of training and experience of a polygraph examiner could therefore have an adverse influence on a polygraph examination and its resultant outcome.

In order to overcome these challenges, Amsel (2015:34) opined that a polygraph examiner had to have the technical inclination as well as flexibility that enabled them to adjust and act in response to the constantly changing conditions of polygraph examinations. In other words, a polygraph examiner should be adaptable and flexible, in order to communicate and converse effectively and efficiently with young and old, educated or uneducated people.

It was further suggested by Herbig (2018:63) that many South African polygraph examiners were merely “polygraph technicians” who rigorously followed procedure and operated an instrument with a predetermined format. In so doing, they lacked the ability to exercise discretion or flexibility, without understanding that people were unique individuals. No two tests were the same, and this had to be taken into consideration when a polygraph examination was conducted.

It was also pointed out by Amsel (2015:35-36), that there was often a lack of proper training in the basic psychophysiology pertaining to the response measures and the analysis of polygraph charts. The failure to stay up to date with, and use, the latest techniques available, as well as the lack of knowledge and enthusiasm to engage with the scientific literature, could result in errors that had the potential to have a negative impact on the outcome of a polygraph examination. Nelson (2015:27), however,

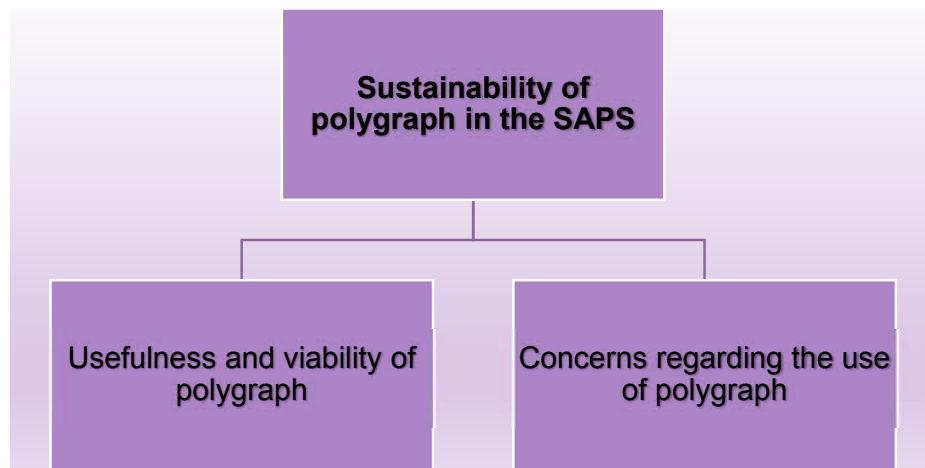
argued that it was imprudent, from a scientific perspective, to attribute all test errors to professional incompetency. Without a doubt, competency did matter, but only a small quota of random testing errors was a matter of reality, because expectations for a perfect polygraph examination all the time were, in actual fact, unscientific.

Nelson (2016:82) concluded that not understanding, educating and empowering others regarding the capabilities and limitations of polygraph examinations, had the tendency to lead to unrealistic expectations that was inconsistent with the capabilities of the polygraph. This could subsequently lead to frustration and disillusion when reality could not be reconciled with unrealistic expectations. It was therefore important that IOs understood that although there were many capabilities of the polygraph, there were also limitations with the polygraph, which were highlighted in Theme Three.

4.7 SUSTAINABILITY OF POLYGRAPH IN THE SAPS

The previous theme provided a snapshot of the impact that polygraph had in criminal investigations within the SAPS. The following section (Theme Four) attempted to determine the usefulness and viability of polygraph as generated from the data. Concerns and issues regarding the use of polygraph were also presented and discussed in this theme. A schematic presentation relating to sustainability of polygraph in the SAPS was reflected in Figure 4.5:

Figure 4.5: Schematic presentation of the sustainability of polygraph in the SAPS.



4.7.1 Usefulness and viability of polygraph

A detailed breakdown of the feedback from the participants regarding the usefulness of polygraph was presented in Table 4.10:

Table 4.10: Summary of participants feedback regarding the usefulness of polygraph

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total
Aid to assist in investigations	1	0	1	1	1	0	1	0	0	1	6
Assist in housebreaking and theft cases	0	0	0	0	0	0	0	0	0	1	1
Assist in revealing false cases	0	0	0	0	0	0	0	0	1	0	1
Assist in departmental cases- loss of firearms	0	0	0	0	0	1	0	0	0	0	1
Beneficial	0	0	0	0	0	0	1	0	0	0	1
Assist in disciplinary cases	0	1	0	0	0	0	0	0	0	0	1
Helpful if confessions are corroborated with supporting evidence/information	0	1	0	0	0	0	0	0	0	0	1
Not useful as an investigative tool	0	0	0	0	0	0	0	1	0	0	1
Used regularly by the private sector	1	0	0	0	0	0	0	0	0	0	1
Useful	1	0	1	0	1	0	1	0	1	1	6

Table 4.10 reflected that six participants described polygraph as “an aid to assist in investigations” and “useful”. Table 4.10 further depicted that polygraph assisted in housebreaking and theft cases (Participant 10), revealing false cases (Participant 9),

departmental cases where firearms were reported lost/stolen (Participant 6), could be of assistance in disciplinary cases (Participant 2), and was helpful if a confession was corroborated with supporting evidence (Participant 2).

Only Participant 8 described polygraph as *“not useful as an investigative tool”*. The participant noted that, *“to be honest, I don’t feel that the polygraph has helped me in my investigations. I usually use it as it is an instruction from the commander”*.

Interestingly, Participant 2, who experienced a false positive result, did not outright reject polygraph as unhelpful, but instead stated that he did not think polygraph helped in a criminal case *“unless you get a confession that is made to an officer and that information would also need to be corroborated, then it would be helpful”*. The participant went on to point out that polygraph could help in disciplinary cases.

4.7.1.1 The usefulness of the polygraph as an investigative aid

Participants 1, 3, 4, 5, 7 and 10 identified polygraph as an aid that assisted investigations. Participant 1 said that *“it gives you a guideline in what direction you must go”*. Participant 3 expressed that *“you cannot prove 100 percent, I understand. But like an aid, to strengthen the version of a witness to prove that he is speaking the truth, it can steer you in the right direction”*. Participant 4 echoed the sentiment by saying that *“I believe that this is one of those essential tools needed to assist investigators with their cases”*. Participant 5 articulated that it *“is a viable aid at times. It is there to give direction in an investigation”*.

The term “useful” was used by six participants, namely participants 1, 3, 5, 7, 9 and 10, to describe the polygraph. Participant 10 accentuated that *“sometimes we get information we did not know before the test. Also very often, in housebreakings, the complainant is happy and impressed that we go the extra mile to arrange and coordinate polygraph tests, which is no cost to them. So, in a way, it is a useful aid to have”*.

In the US, polygraph examinations conducted by the FBI in criminal investigations, were used as a tool to focus and direct an investigation, and to elicit information and

confessions. According to FBI policy, the results were not, in general, used in court proceedings, although voluntary admissions made during the polygraph process may be used as evidence (U.S. Department of Justice, 2006:52).

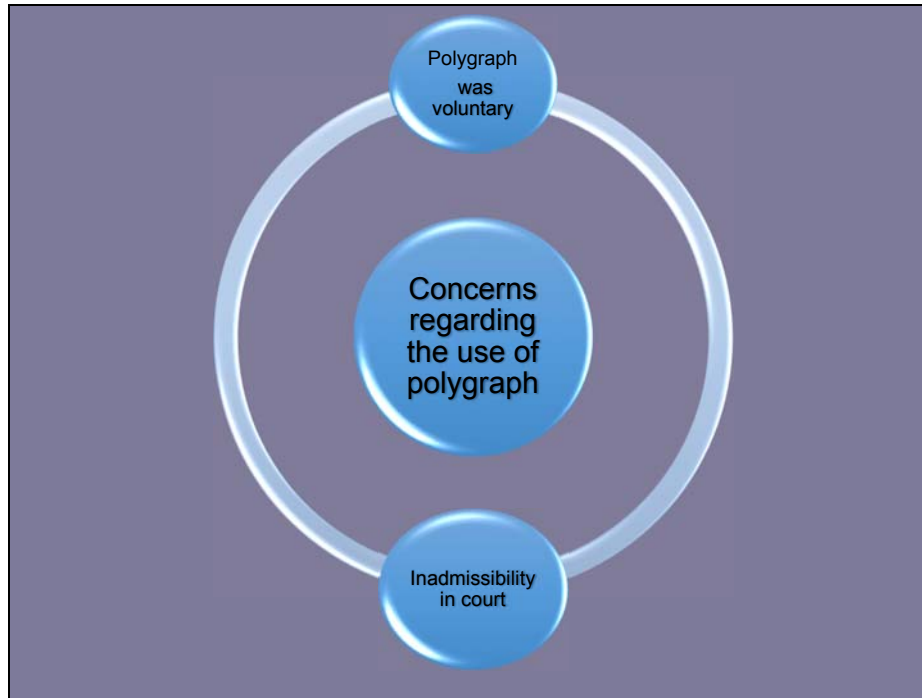
Sosnowski (2008b:np) pointed out that when polygraph was used properly as an investigative tool, it could exclude unjustly accused persons and identify the guilty, thus providing an investigator with a more efficient and productive use of their time. Grubin (2010:448) reiterated that many law enforcement agencies in various countries used polygraph in criminal investigations. From time to time, the intention was to exclude people from suspicion, on occasion to strive for a confession, and, from time to time, it was there to provide the investigation with new direction or focus. It was essential that investigators understood that polygraph was an investigative tool, and was by no means a substitute or replacement for customary investigatory practices in the absence of legislation governing the use of polygraph in South Africa.

Although IOs who generally used the polygraph as an investigative aid found it to be useful, (as reflected in Theme Four) some of them nevertheless also had trepidation regarding the polygraph. The forthcoming sub-theme highlights the concerns that investigators raised regarding the application of polygraph examinations in criminal cases.

4.7.2 Concerns regarding the use of polygraph in criminal cases

Proponents for and against polygraph had, in reviewed literature, raised concerns and challenges regarding the application of polygraph examinations. Similarly, in this study, trepidation regarding the use of polygraph was also accentuated by participants who used polygraph examinations as part of criminal investigations, as shown in Figure 4.6:

Figure 4.6: Diagrammatic presentation of concerns raised regarding the use of polygraph.



The concerns that were cited by the participants regarding the use of polygraph in criminal investigations, was diagrammatically presented in Figure 4.6. One of the first issues of concern emanating from the data was that a polygraph examination was voluntary, followed by concerns regarding the inadmissibility of the polygraph in court proceedings. These trepidations are discussed further in Theme Six that follows.

4.7.2.1 Polygraph was voluntary

The fact that all polygraph examinations were voluntary, were raised by three participants. Participant 5 stated that *"people can say that they do not want to do the test or they can get can get advice from a lawyer. As a result, we cannot force them to do the test even if we have our suspicions. It could be used more often, but people generally choose to refuse to do the test"*.

Participant 6 also expressed concern that the polygraph examination was voluntary, saying that *“people can refuse to do the test and we can’t force them to do it I mean everyone has rights”*.

Similar sentiments were voiced by Participant 7, who stated that *“...sometimes people agree to go for the test, only for them to change their minds once all arrangements have been made for the test”*.

Indeed, all polygraph examination were voluntary. The APA Standards of Practice (APA, 2018c:5) stated that “the examiner shall obtain the informed consent of the examinee prior to the testing”. This meant that consent from the examinee had to be in writing, and that submission to a polygraph examination was voluntary. All polygraph tests conducted within the SAPS also conformed to the APA Standards (APA, 2018c:5), which stipulated that all polygraph tests were voluntary. This meant that no person was forced to submit to a polygraph examination by any person, including the police. Polygraph examiners therefore had an ethical responsibility to ensure that no one was compelled or intimidated into taking a polygraph test. Initially, a person could verbally agree to submit to a polygraph examination when requested by an IO, but had the right to rescind the decision at any stage, even once the polygraph examination had commenced.

It was apparent from the findings of this study that some investigators saw this as a concern, especially since two participants cited that the subjects had agreed to do the test, but once the test was scheduled they “changed their minds” about taking the polygraph examination.

Additionally, Participant 5 voiced the concern that people could refuse to consent to a polygraph test. Although refusal to submit to a polygraph test was considered a challenge to an investigator, it was nevertheless imperative that it was understood that no person was compelled to submit to a polygraph test. Even if they initially committed, an individual could refuse to proceed further. In the South African legal system, no person needed to prove their innocence, as the onus to prove guilt beyond a reasonable doubt was the responsibility of the state. It was unfair to infer that a person refusing to take a polygraph test had ‘something to hide’, as no individual should feel

obligated to prove their innocence. In other words, refusing to undergo a polygraph examination did not indicate guilt (Marks, 2014:37; Rheeder, 2012:4).

4.7.2.2 Inadmissibility in court

The second concern raised by four participants was the inadmissibility of polygraph in court proceedings in the South African judicial system. Participants 3, 8, 9 and 10, who used polygraph examinations, voiced concerns that polygraph was inadmissible in court.

Participant 3 expressed concern that the polygraph *“is being questioned in court”* and presently an IO can *“only use it as an aid and not as evidence like for instance ballistics or DNA that is 100 percent accepted in court”*.

A similar sentiment was articulated by Participant 8 that polygraph could not be presented in court as *“...it is not an exact science that is accepted as ballistics and DNA which are accepted and recognised by the courts”*.

According to Participant 9, it was concerning that polygraph was not used in court and it made no sense *“wasting so much of resources but we can’t use it in court”*.

Participant 10 reiterated the fact that it was a concern that polygraph was not used in court especially since it was *“used in the private sector and it is also not illegal”*.

Despite the concerns and reservations that polygraph was not being used in court, the participants did concede that they were not deterred from using the polygraph as they opted to use it as an investigative aid to guide an investigation.

Over the years, there have been a considerable number of postgraduate studies undertaken about the application of polygraph. Studies by Joubert (2005), Prinsloo (2007), Calaca (2010), Watson (2011), Mothibe (2012), Kondiah (2012) and Marks (2014) revealed that a vacuum existed when it came to legislation, regulations, guidelines or codes of practice regarding the application of polygraph in the criminal and private spheres. There were also been no decided cases in criminal proceedings.

As Rheeder (2012:16) and Collier (2001:26) pointed out, there was a dearth of reported cases or judgements regarding the admissibility and applicability of polygraph evidence in the South African judicial system. Furthermore, no court, be it criminal, labour or civil, had implemented any guidelines as to when a polygraph examination and/or polygraph results would be acceptable as evidence on its own. According to Rheeder (2012:17), the biggest challenge with the application of polygraph in the criminal sphere concerned the reliability of polygraph examinations and a possibility of prejudice that the accused could endure if the evidence was accepted.

The Constitution (South Africa, 1996), section 12(1)(d) supported the individual's right not to be tortured in any way. Section 12(1)(e) further specified that people should not be treated or punished in any way that could be deemed to be cruel, inhuman or degrading, while section 12(2)(b) advocated that all people had the right to bodily and psychological integrity, which included, as pointed out in section 12(1)(b), the right to security in, and control over, their body.

Finally, section 12(1)(c) was explicit that no person was to be imperilled in any scientific or medical research without their informed consent. Therefore, individuals who were required to be polygraphed had to be treated with respect and dignity, and their refusal to be subjected to a polygraph examination should not be considered as an admission of guilt (Rheeder, 2012:4). The APA bylaws (2018a:7) were also explicit that the rights and dignity of any individual who submitted to a polygraph examination had to be respected at all times by polygraph examiners.

The APA Standards of Practice (2018c:5) stated that a polygraph examiner had to acquire the written consent of a subject before the testing process. It was emphasised by Van Damme (2001:7) that consent has to be acquired prior to a person being subjected to a polygraph examination, and that their rights had to be explained in terms of section 35(1) of the Constitution. Not informing individuals of their rights was a violation of the Constitution. SAPS polygraph examiners were compelled to inform a person subjected to a polygraph examination, of their constitutional rights. The person had to verify that they understood their constitutional rights, as well as the purpose of the test, in writing.

The examinee also had to be informed of their right to obtain advice from a legal representative prior to agreeing to the polygraph test. Should an examinee not give consent to the polygraph examination, the test had to be terminated. A polygraph examination by a police polygraph examiner also had to be terminated immediately if it became known that the examinee was threatened, coerced or assaulted in order to consent to the polygraph examination, because from the onset it had to be made known to the examinee that the test was voluntary.

Although notes were made by the polygraph examiner, the entire polygraph process was video-recorded. According to Krapohl and Shaw (2015:133), recording the polygraph examination protected the polygraph examiner and the examinee, or it provided indisputable evidence against those who acted in a reckless or unethical manner. Additionally, the recordings could be used for educational purposes when it came to training and mentoring new polygraph examiners.

Sometimes, before, during or after a polygraph examination, an examinee could elect to make admissions, or even a confession, to the polygraph examiner. In the US, confessions obtained during or after a polygraph test were admissible as long as they met constitutional standards as outlined by the US court system (Vaughan, 2015:np). Joubert (2010:315) submitted that in the South African legal system, an accused could only be found guilty of an offence as a result of a confession if it was confirmed in a material respect, or if other evidence was presented that substantiated the confession.

This implied that according to the requirements stipulated in section 209 of the Criminal Procedure Act (Department of Justice, 1977), an IO could not rely exclusively on a confession in their investigation in an attempt to secure a conviction. Other reliable evidence, independent of the confession, had to show beyond any reasonable doubt that the offence was indeed committed by the indicted person (Joubert, 2010:403). By the same token, investigators should not rely predominantly on confessions to solve their cases, and neither should polygraph examinations be solely directed at obtaining confessions, as many polygraph examiners tended to focus on obtaining confessions before, during or after a polygraph examination.

At the APA conference in September 2015, Nelson (2015:np) stated, that the primary objectives of conducting polygraph tests were threefold, namely to gather new information, serve as a deterrent and the detection of deception and/or truth, and not to focus exclusively on obtaining confessions. It was reiterated by Grubin (2016:98) that disclosure was an important output of polygraph examinations. People often divulged information in the course of a polygraph examination that they would, under normal circumstances, would have kept to themselves. Acknowledging and understanding the objectives and purpose of polygraph examinations, and not focusing exclusively on polygraph being presented as evidence in court, was especially important and relevant in South Africa, as there was a dearth of guidelines regarding the application of polygraph examinations in criminal proceedings.

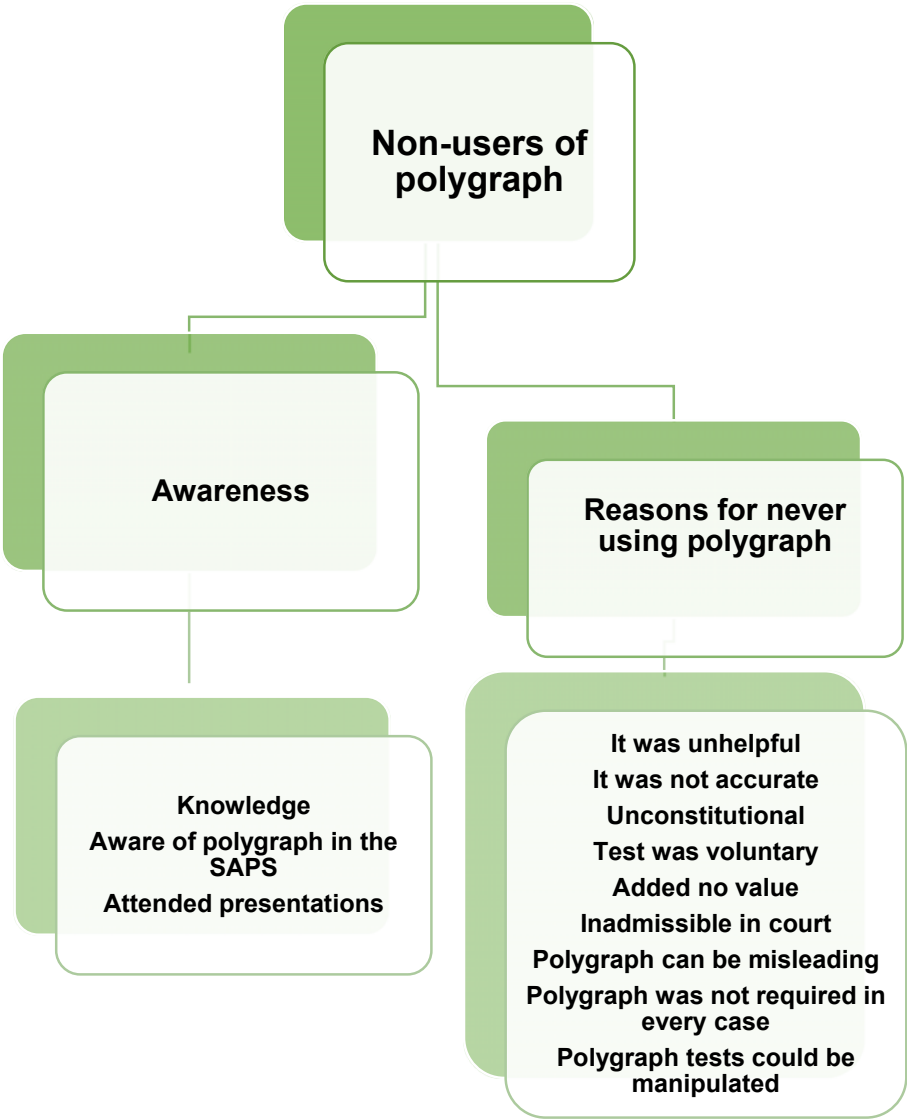
Up to this point, the findings presented reflected data emanating from IOs who used the polygraph in criminal investigations. The study would be considered biased and incomplete, had the focus of the investigation only been on IOs who used the polygraph, as a vast number of IOs within the SAPS did not use the polygraph. Consequently, the study shifted focus to IOs who never used polygraph. The reason for this change in focus, was to grasp why some IOs used the polygraph while many others opted not to do so. In order to gain knowledge as to the reasons why polygraph use in criminal investigations in the SAPS was not widespread, it was fundamental to engage with non-users of the polygraph. Themes Five and Six, respectively, focused on the views of non-users of the polygraph.

4.8 NON-USERS OF POLYGRAPH

In Theme 5, as highlighted in Figure 4.7, focus shifted to the non-users of polygraph. Ten participants (namely participants 11 to 20) who had never used polygraph were interviewed for this study. The areas highlighted in this theme addressed awareness of polygraph generally, awareness of polygraph within the SAPS, and possible reasons why many IOs did not use the polygraph in any criminal investigation. Consequently, the contribution by the ten investigators who had never used polygraph before, provided data to help determine why polygraph was not, and had never been, an option in their investigations – in other words, to understand why polygraph use

was not widespread in the SAPS. Figure 4.7 presents a synopsis of the data that was collected by non-users of the polygraph:

Figure 4.7: Overview of non-users of the polygraph



4.8.1 Awareness of polygraph

The ten participants stated that they knew that polygraph examinations were available as a forensic aid. In recent years, as the popularity of crime investigation television series such as CSI, NCIS, and Law and Order, to mention a few, had escalated, there

were greater awareness of the various investigative aids that were available to address the crime scourge in the country. It was reasonable to assert that increased publicity of the forensic sciences in popular culture had led to increased public awareness (Julian et al, 2011:217). Polygraph was one of the investigative aids that had received considerable attention.

4.8.2 Awareness within the SAPS

Participants who were non-users of polygraph were asked whether they were exposed to the polygraph, as the study attempted to determine whether the participants had attended any training or awareness sessions, or had been exposed to any literature regarding the forensic science disciplines available within the SAPS. Table 4.11 reflected the awareness to which non-users of polygraph were exposed:

Table 4.11: Summary of non-users exposure regarding awareness of polygraph

Awareness	Number of participants
Aware of polygraph in the SAPS	7
Had attended presentations on polygraph	2
Subjected to polygraph (vetting)	3
Seen forensic fact file on polygraph	2

Seven participants acknowledged that they were cognisant of the fact that polygraph was available within the SAPS, two participants had attended presentations on polygraph, and two participants had read through the Forensic Fact Files on polygraph available on the SAPS intranet, with three participants had been personally subjected to vetting (screening) polygraph examinations. Having awareness, but never using the polygraph, was the impetus for the next question relating to why non-users who had some kind of experience or interaction with the polygraph did not use it in investigations.

4.8.3 Reasons for not using polygraph

Table 4.12: Synopsis of reasons polygraph was not used.

Reason	Number of participants
Added no value to cases	3
Felt to be unhelpful	2
Inadmissible in court	7
Accuracy of polygraph	6
Polygraph was voluntary	2
Polygraph was not required in every case	1
Unconstitutional	1
Polygraph can be misleading	2
Polygraph tests can be manipulated	1

Table 4.12 highlighted the reasons why IOs did not use, or want to use, the polygraph. The main reasons for polygraph not being used were because it had no value to add to an investigation (3), it was unhelpful (2), inadmissible in court (7), inaccurate (6), polygraph can be misleading (2) and the test was voluntary (2).

Some participants had very strong views on why they do not, and would not, use polygraph. Participant 11 said,

“I can’t see it helping me in my investigations. I mean it’s not admissible in court. What is the point of using something that you can’t use in court? When it comes to DNA, ballistics, fingerprints, there is no problem with them in court. The court accepts that type of forensic evidence without any issues or problems. So personally, I see no reason to use it”.

According to Participant 12,

“The issue I have with polygraph is that it is not accurate. I feel I am justified to make such a statement because I have been for polygraph tests. Although I have passed I am not convinced of the accuracy or that it is of any value in an investigation. I know

of good, hardworking, innocent people who have failed the polygraph. I mean...how can that be? So personally, I would not want to use the polygraph”.

Participant 13 stated that,

“Polygraph is not going to be of assistance in fraud and corruption investigations that we are dealing with. I wouldn’t use polygraph in an investigation because it can lead you on a route that is not what the document evidence/trail is telling. We follow documentary evidence. Everything is in black and white. If a person passes it does not mean he didn’t do the crime? The polygraph then will lead me to exclude him and now that is the danger”.

Participant 14 expounded that,

“polygraph is not a useful tool, it is not an accurate tool. Inaccuracies are a big issue for me... also about the constitutional rights. In any court of law, in a criminal court the polygraph will be challenged. No lawyer, attorney or judge would allow polygraph evidence to be admissible in a case in this country, I will bet my entire month’s salary that no court will allow polygraph evidence because it is unconstitutional. The court wouldn’t allow it in terms of admissibility or even for investigation purposes. It will never be allowed, never. It is unconstitutional. Polygraph can lead you down the wrong path. Polygraph measures your heart rate, blood pressure, adrenaline and medication. It can be manipulated with drugs and if you are a master conman it is easy to be manipulated. If you are a habitual liar, you can manipulate the test. If you believe yourself you can look in the face of the polygraph examiner and lie because you are believing your own lies. It acts on a conscience”.

4.8.3.1 Polygraph added no value to an investigation

In the study, three participants, namely participants 17, 18 and 19 stated that they would not use polygraph in an investigation as it would not add any value towards solving a case. Participant 18 echoed that she had *“so many dockets, I really can’t waste my time on something like a polygraph that is not guaranteed to solve my case or get me conviction in court”*. It was further emphasised by Participant 17 that *“I do*

not use it because I don't feel that it can add much value to my cases ... it cannot be used in court".

Unlike the other forensic science disciplines, which were readily and easily accepted in criminal proceedings, polygraph was not. For an investigator, having tangible evidence that could be presented in criminal proceedings was fundamental. Polygraph was used as an investigative aid; in other words, it was there to guide or direct an investigation.

According to Grubin (2016:97), the two primary outputs of a polygraph examination were the results of the test and the disclosure of information. Although polygraph was generally associated with the detection of deception, detecting truthfulness was equally important, as very often, innocent people were suspected of wrongdoing. Polygraph examinations could therefore afford an innocent person an opportunity to clear their name, or be eliminated as a possible suspect. This could direct an investigation to a different path, and, in the process, save valuable time and resources.

Grubin (2016:98), further expounded that studies revealed that people recount information during a polygraph examination that they would under normal circumstances not have disclosed. Critics argued that the reason for this was that examinees who believed that the polygraph worked were more likely to divulge information rather than those who did not believe it worked. It was also cited by Nelson (2015:np) that a goal of polygraph examinations was the disclosure of new or additional information.

Similarly, the National Research Council, (2003:25) emphasised that it was imperative to take cognisance of the fact that a polygraph examination should not be the only source of information used to ascertain the examinee's deceptiveness or truthfulness. In a criminal investigation, various investigatory techniques had to be employed. It was as a result of any of the investigative techniques used, that the person/s (suspect/s) could be identified to be polygraphed.

All policy decisions regarding the application of the polygraph should therefore take into account information that could be gained from the polygraph, as well as the

potential value it could contribute to that which was be learnt from other available investigatory techniques. Polygraph could impact or be impacted by other investigatory methods, in known or unknown ways. For instance, evidence could direct an investigation towards particular suspects who would then be subjected to a polygraph examination, or a polygraph examination result could steer an active investigation to focus on one person, and exclude others from the investigation. The value and usefulness of a polygraph examination did not lie exclusively in its ability to detect deception. It could also play a significant role in deterring people from certain (illegal) actions or behaviours, because it was feared that a polygraph examination may disclose their involvement.

4.8.3.2 Polygraph was unhelpful

Two participants, Participant 11 and Participant 15, reported that they did not and would not use the polygraph because it was unhelpful. In this study, users of polygraph cited polygraph to be helpful and useful as discussed in section 4.7.1. Objectively, it could be argued that polygraph may be considered unhelpful when innocent subjects fail (false positive) or guilty subjects pass the polygraph test (false negative), as pointed out by Participant 2. It could also be asserted that polygraph examinations were unhelpful when inconclusive or no opinion results were obtained. An inconclusive result occurred when there were insufficient physiological reactions recorded during the in-test process, and the polygraph examiner was unable to determine whether the examinee failed or passed the test (Hanekom, 2016:46).

A no-opinion result was when the polygraph examiner was unable to collect sufficient recordings during the in-test phase to determine an outcome of the polygraph examination. This could be because an examinee decided to terminate the test before a minimum of three charts were collected for analysis (Hanekom, 2016:46). In such instances, at the end of the polygraph examination, no tangible results are available to the IO. These situations did happen, but could be regarded as the exception rather than the norm, if a polygraph examiner adhered to the procedures that were in place to conduct valid polygraph examinations.

4.8.3.3 Polygraph was inadmissible in court

Seven non-users of polygraph in the study raised the issue of inadmissibility of the polygraph in court. Participants 11, 16, 19 and 20 expressed the sentiment that polygraph could not be used in court. The participants were resolute that they sought access to investigative aids that could be presented as evidence in court. There was no getting around this point about which participants were very vocal. Participant 14 especially, was so fervent that he said he *“would bet my entire month’s salary that no court will allow polygraph evidence because it is unconstitutional”*. Participant 19 wanted to use investigative aids that enabled her to *“secure a conviction”*. Participant 15 concurred that investigators wanted *“aids that could be used as evidence in court”*.

Today, many cases were solved by the adoption of forensic techniques and procedures, whereby a comprehensive probe of the crime scene was conducted and a subsequent analysis of the forensic evidence ensued. The work of the forensic analyst, therefore played an imperative role in criminal investigations (Lee & Pagliaro, 2013:1). More than ever, the law enforcement community was dependent on forensic science to help in solving crime and obtaining convictions (Julian et al, 2011:217). The general consensus among the investigators interviewed was that the legality of polygraph was very important. A detailed discussion regarding polygraph and the law, specifically in South Africa, was presented in literature reviewed, encompassed in Chapter 2 and section 4.7.2.2 of this study. Essentially, unless polygraph was admissible in a criminal court of law, investigators would continue to have reservations about using the polygraph optimally.

4.8.3.4 Accuracy of polygraph

Six participants highlighted concern that polygraph was not 100 percent accurate. Participants 11, 15 and 17 expressed consternation regarding the accuracy of polygraph examinations, with Participant 14 arguing that,

“without a doubt, accuracy...is an issue...historically, case law has shown that there are too many inconsistencies with the polygraph...just google about polygraph and

you will come to many studies and articles that make reference to polygraph not being accurate”.

Participant 12 stated that although she had personally submitted to a polygraph examination and had passed, she was not convinced of its accuracy as she was aware of innocent people who had failed. Participant 18 echoed a similar sentiment, that he knew innocent people had failed and *“guilty people joked that they had passed the test...that is no help to me in a case”*. Participant 2, at the beginning of the empirical stage of the study stated that he acknowledged and agreed that,

“a polygraph examination could not be 100 percent accurate as we are dealing with people”. The participant added that “...some people are very good liars. They lie all the time...people can be so convincing...they tell the story over and over that they convince themselves that they are telling the truth”.

Undeniably, no research studies regarding the polygraph had been able to cite or prove that polygraph was 100 percent accurate. Nelson (2015:92) stated that the mean accuracy rate of single issue polygraph examinations as used in criminal investigations, ranged from the high 80 percent range to the low-to-mid 90 percent range, with a lower limit of accuracy in the mid-80 percent range. Nelson (2016:74) further cited research findings by the National Research Council (2003), which indicated a reported median accuracy as 83 percent. An exhaustive and definitive literature search that was carried out by the National Research Council (2003) concluded that the accuracy rate for polygraph was understood to be in the range of 81 to 91 percent (National Research Council, 2003:4).

The debate around the accuracy of the polygraph was further complicated by the fact that there were various types of polygraph examinations, each with varying accuracy rates. Single issue tests and concealed information tests, which were most often used in criminal investigations, were found to have higher accuracy levels than multi-issue tests, which were commonly used for screening and vetting processes (Grubin, 2010:448). Similar findings by the APA in 2011 reported that the polygraph was “capable of providing accuracy that significantly exceeds chance levels” (Nelson, 2016:74).

The key to understanding polygraph was that it was about people, and people had emotions and feelings that could have an impact on what transpired during a polygraph examination. It was postulated by Janušauskas (2014:139) that critics of the polygraph argue that people could disguise anxiety and stress, even when they were lying. Consequently, there was no accurate way to decipher between the stress that was caused as a result of the polygraph test and stress that was triggered by a lie. Janušauskas (2014:139) further argued that polygraph could measure physical reactions, but beyond that it was not known how the human nervous system reacted when it was lying. Emotions such as anxiety, apprehension, fury, melancholy, humiliation and panic could all be instrumental factors that altered an individual's heart rate, blood pressure or respiration rate. In addition, a number of illnesses such as a cold, influenza, headache, constipation, or neurological and muscular conditions, could trigger physiological vicissitudes in the body that could be recorded by the polygraph as reactions. Some people could fear that the polygraph instrument would point out that they were being deceitful when they were in fact being honest, and that they would be incorrectly accused of lying, thus having an impact on the polygraph examination.

Vicianova (2015:526) was in agreement that indicators of nervousness, fear, or emotional turmoil did not only occur in deceptive people, but also in individuals who were being truthful. One could therefore infer that polygraph did not distinguish lies, but rather measured and recorded physiological reactions postulated to be linked with deception. There were no reactions or responses that were exclusive to deception, nor could it be conclusively argued that were necessarily present when deception occurred. The National Research Council, (2003:7), however, concluded in their report that when used by "well-trained examiners in conjunction with other techniques, it appeared to offer a useful adjunct in identifying those who deceive".

Nelson (2015:29) argued that there was no perfect polygraph test. If there was, it would mean that polygraph would have an accuracy rate of 100 percent. Polygraph examinations were required and used when an issue could not be measured directly. In other words, a polygraph examination was not needed when it was possible to observe deterministic phenomena. Polygraph examinations were probabilistic and not deterministic. Deterministic results were constant, irrespective of choices and the

behaviour of people or random chance. Deterministic results involved no uncertainty or error, and were not subject to any human behavioural interference that was not theoretically perfect. As a result, polygraph results could not be deterministic, because there was no unique physiological lie response and was, therefore, probabilistic (Nelson, 2015:30-33).

Due to the fact that there was no known test considered to be perfect, it had to be understood that errors could occur, due to the incorrect execution of testing procedures or incorrect test instrumentation. The accuracy of the polygraph was reliant on a number of factors, namely professionalism, use of published standards, following and adhering to procedural rules, supervision, education and training, quality control, and the acquiring of professional experience (Nelson, 2018:45). Additionally, the accuracy of polygraph examinations were reliant on effective interviewing practices, appropriate test administration, effective test data analysis along with good instrumentation, good and suitable questions, and as well as a suitable examinee (Nelson, 2014:46).

Herbig (2018:64) concurred and reiterated that failure to keep abreast of, and use, the latest and best available techniques or willingness to interact with the scientific literature regarding accuracy rates and risks of error, had led to reckless and irresponsible statements and blatant mistakes. Consequently, this ignorance did considerable harm in both the criminal justice and public domain. It was thus imperative that although the polygraph was not perfect, and did not yield accuracy rates of 100 percent, cognisance of the factors emphasised by Herbig (2018:64), Nelson (2018:45) and Nelson (2014:46) should be taken into account to make certain that polygraph examinations were done in the appropriate manner, to ensure that the possibilities of errors were minimised, thereby guaranteeing acceptable accuracy rates.

4.8.3.5 Polygraph was voluntary

Two non-users of polygraph pointed out that polygraph was voluntary, and that no individual could be compelled to submit to a polygraph examination. As Participant 16 said, *“the people we wished to have polygraph backed out before the tests could take*

place...other times, people point blank refused to do the test". Participant 20 concurred that *"if a person asked to do the test says no, we cannot force them to do the test. It is pointless calling out a polygraph examiner if the person does not consent"*. Similar concerns were also raised by participants who generally used polygraph examinations, as discussed in section 4.7.2.1.

4.8.3.6 Polygraph was not required in every case

In the study, only Participant 20 stated that one of the reasons that polygraph was never used was due to the fact that there *"has not been a need in any case"*. Murphy and Pumphrey (1996:2) advocated that polygraph should be considered where there was insufficient or missing information. In addition, a polygraph examination could not and should not be administrated when an investigation was incomplete, as polygraph was by no means a substitute for other investigatory techniques such as interrogations. It implied that the investigation should have exhausted all likely avenues and leads before opting for a polygraph examination. It was therefore understandable that an IO would not require polygraph examinations in any cases that were specifically assigned to them, considering the array of investigative aids that were available to an IO in the SAPS.

4.8.3.7 Polygraph was unconstitutional

Although the issue regarding the admissibility of polygraph evidence in criminal proceedings had featured prominently throughout the analysis of the data, only Participant 14 argued that polygraph was "unconstitutional". In sections 2.13 and 4.7.2.2, respectively, the admissibility of polygraph in criminal proceedings in the South African legal system was discussed. As emphasised previously, it was crucial that examinees knew their rights in terms of section 35(1)(b)(i), (ii)(2)(b), (3)(j) and Section 10 (Bill of Rights) of the Constitution, prior to being subjected to a polygraph examination, as not informing an individual of their rights amounted to a violation of the Constitution.

4.8.3.8 Polygraph results could be misleading

Participant 14 expressed concerns that an incorrect result could be obtained, meaning that an innocent person could fail (false negative) or a deceptive person could pass (false positive). This participant had experienced a polygraph test and passed, but knew people who had failed. As stated by Nelson (2016:74), a polygraph was neither perfect nor infallible and it therefore could not be expected that results would be perfect. The polygraph examiner had a responsibility to take cognisance of this by ensuring that all processes and procedures, as outlined by the APA and the SAPS, were followed correctly.

It was also pointed out by Participant 13 that *“if a person passes it does not mean that he didn’t do the crime. The polygraph then will lead me to exclude him and now that is the danger”*. The concerns raised by Participant 13 were valid and it was therefore important that IOs understood what polygraph results denoted. A No Deception Indicated (NDI) result implied that an individual had passed a polygraph examination. According to the Federal Examiner Handbook (2011:8), an NDI result was the opinion of the polygraph examiner, indicating that an analysis of the polygraph charts collected revealed that the physiological reactions to the relevant question/s did not indicate deception. When a person failed a polygraph examination, the Federal Examiner Handbook (2011:8) referred to it as the opinion of the polygraph examiner, which implied that an assessment of the polygraph charts revealed that the physiological reactions to the relevant question/s did in fact indicate deception.

It is important that the polygraph examiner had all the case facts available, so that appropriate questions that were relevant to the investigation could be determined. As postulated by the APA Standards of Practice (2018c:4), before the commencement of a polygraph examination, the polygraph examiner had to have commit ample time to ascertain and discuss the case facts, issues relevant to the examination, and any potential problematic areas envisaged, with the investigator. If a polygraph examiner did not have at his disposal the appropriate information, there was the likelihood that incorrect questions would be used which would mislead an IO.

Rheeder (2012:17) cited the murder case of Charlene Human, where the suspect was polygraphed and passed the test, whereupon receiving the results of the polygraph examination, the IO in the case chose not to exclude him as a suspect. As a result of further investigation and subsequent interrogation by the IO, the suspect who had passed the polygraph examination was identified as the actual suspect. Similarly, in this study, Participant 2 indicated that although the individual polygraphed had passed the test, he nevertheless followed his 'hunch' and chose not to exclude him from the investigation.

Finally, it was emphasised by Nelson (2016:74) that it was important to understand the scientific basis of the polygraph, as effective policies for polygraph usage also required an understanding of the limitations and potential vulnerabilities of a polygraph examination. It was therefore important that investigators understood that the polygraph was an investigative tool. Once an IO had obtained a polygraph examination result, it was up to them to continue with the investigation, taking into account the polygraph examination results. The polygraph examination should not be the end of an investigation, but the beginning. An IO could use the information and insight obtained from the polygraph examination to guide the investigation, as those participants who were using the polygraph stated.

4.8.3.9 Manipulation of polygraph examinations

A final concern emanating from the study was Participant 14 expressing trepidation that a polygraph examination could be manipulated:

“It can be manipulated with drugs and if you are a master conman it is easy to be manipulated. If you are a habitual liar, you can manipulate the test. If you believe yourself you can look in the face of the polygraph examiner and lie because you are believing your own lies”.

Vrij (2007:314) stated that when people knew that they were going to be judged as convincing, they could attempt to influence their responses in a way that they made a credible impression. Vrij (2007:314), McManus (2008:75) and Krapohl et al (2012:22) explained further that examinees sometimes attempted to sway the outcome of a

polygraph examination by attempting to produce physiological responses to mislead or deceive, which would steer the polygraph examiner to conclude that they were not deceptive. Such attempts were known as countermeasures. Schuetzler (2012:3) referred to countermeasures as intentional techniques that were used by guilty individuals to appear innocent. Consonant herewith, Handler, Honts and Goodson (2015:129) and Handler, Honts and Blalock (2015:82) also described countermeasures to be anything that an individual subjected to a polygraph examination did, to try and change the test data so as to obtain a test result that was classified as truthful.

Vrij (2007:314) distinguished between two main categories of countermeasures, namely, mental and physical countermeasures. Mental countermeasures involved thinking about an upsetting or distressing experience or mentally counting backwards. Physical countermeasures included pressing the toes against the floor or biting the tongue. It is envisaged that these countermeasures resulted in physiological responses that were detectable by a polygraph examiner. It was further submitted by Otter-Henderson and Honts (2001:11) that countermeasures could be effected premeditatedly (with or without training) or extemporaneously without training or forethought. Handler et al (2015:129-130) identified countermeasures as falling into four categories, namely general state countermeasures, specific point countermeasures, spontaneous countermeasures and information countermeasures.

4.8.3.9.1 General state countermeasures

According to the APA Brief of Amicus submitted to the Alaska Court of Appeals (APA, 2014b:39), general state countermeasures were intended to have an impact on the overall mental or physical state of the individual. The objective of general state countermeasures were to change the examinee's psychological state and/or physiological reactions during the entire examination process. These measures included the use of drugs, relaxation or intrusive means, mental tactics such as disassociation, self-deception or rationalisation (APA, 2014b:39; Krapohl et al, 2012:39; Handler, Honts & Blalock, 2015:130).

4.8.3.9.2 Specific point countermeasures

The APA Brief of Amicus submitted to the Alaska Court of Appeals (APA, 2014b:39) and Handler, Honts and Blalock (2015:130) described specific point countermeasures as actions that the examinee engaged in at particular points during the polygraph examination process. These included endeavours that moderate reactions and responses when the relevant questions in the test were being asked, but were mainly used to increase the responses when the comparison questions were asked during the in-test phase. Either physical or mental countermeasures or a combination of both could be used.

4.8.3.9.3 Spontaneous countermeasures

According to Handler, Honts and Blalock (2015:130), spontaneous countermeasures were committed without any planning or foresight. It was established in laboratory studies that examinees had recounted using measures such as “relaxation, rationalisation, imagery, attempts to control their breathing, or heart rate, trying to stay calm, biting their tongue and pressing their toes at random places”.

4.8.3.9.4 Information countermeasures

Irrespective of whether they were guilty or innocent, people who were aware that they were going to take a polygraph examination, generally tried to find information about polygraph techniques and countermeasures from the Internet or other sources. This search for information could be inspired by an effort to placate their inquisitiveness, to conceal deceit or was an attempt to make certain that the truth was evident (Handler, Honts & Blalock, 2015:130).

In a study conducted by Schuetzler (2012:3), two types of behavioural countermeasures were identified, namely physical and mental countermeasures. By means of physical actions, such as biting one’s tongue or pressing one’s toes against the floor, almost 50 percent of the participants were able to effectively deceive the polygraph examiner to believe that they were telling the truth. The participants were also able to deceive the polygraph examiners by increasing their mental ability by

counting backwards. The participants only had about 30 minutes of training in all the countermeasures that were used by them. The study by Schuetzel (2012), therefore, showed that it was vital to recognise the fact that it was possible that knowledgeable individuals who were deceptive, could exploit the polygraph process to appear innocent.

As pointed out by Grubin (2016:108), countermeasure techniques were a reality, and could be easily taught and learnt, as there were many websites that offered to do so. It should, however, be remembered that polygraph examiners also browsed through the same websites as their examinees, and were therefore able to exercise caution if they felt that countermeasures were being used during the examination process.

Krapohl (2013:39) submitted that countermeasures had advanced along with the field of lie detection. In 1945, John Reid developed an examination chair with sensors to detect clandestine movements. Due to the fact that physical countermeasures could considerably diminish the detection of deception in the absence of sensors, the APA in 2010 mandated the use of the movement sensor that became mandatory on 1 January 2012 (APA, 2018c:18). Although the movement sensor was not been proven useful for other types of countermeasures, it was considered essential in detection and deterrence of physical countermeasures.

Finally, according to Handler, Honts and Blalock (2015:135), research into countermeasures was incomplete, and further studies were vital. The limited research, however, indicated that countermeasures were undoubtedly also an issue that was often a concern to polygraph examiners.

Theme Five provided an in-depth analysis and discussion as to why participants who were non-users of polygraph did not consider polygraph as a viable and beneficial diagnostic aid in criminal investigations. The views expressed, which amounted to shortcomings that were identified with regard to the application of polygraph in criminal investigations within the context of the SAPS, were a fundamental deterrent in the optimal use of polygraph in criminal investigations within the SAPS. The participants who opted not to use polygraph as an investigative aid, expressed very strong views and reasons as to why they did not use or wanted to use polygraph. In the final theme, the study attempted to determine if participants 11-20, who were non-users of

polygraph, had a better understanding of polygraph and its use, whether it would change their views and consider if the need arose, to use polygraph as an investigative aid in criminal investigations.

4.9 BETTER UNDERSTANDING OF POLYGRAPH FOR NON-USERS

Finally, Theme Six attempted to determine whether a better understanding regarding the application of polygraph would make a difference to the participants who were non-users of polygraph. Six participants expressed a strong stance that they would not consider the use of polygraph in criminal investigations, even if they had a better understanding of polygraph. The fundamental concerns, namely accuracy rates of polygraph examinations and the inadmissibility of polygraph evidence in criminal proceedings, had to be addressed before the participants would re-evaluate their views regarding the utilisation of polygraph.

Participants 11 and 15 said that they were unsure whether they would consider using the polygraph if they had a better understanding of polygraph, as Participant 15 stated that *“it was a controversial subject”*.

Participant 18 said that *“it was unlikely”* that he would use the polygraph unless *“instructed by his commander”*.

It was only Participant 20 who, after some time and consideration, was open-minded and said that he would consider using polygraph examinations in the future, as he had acquired a better understanding of the polygraph.

From this it can be seen that it was not necessarily about a lack of awareness or understanding that investigators were not keen to use the polygraph. Themes Five and Six, respectively, focused specifically on the non-users of polygraph. The findings indicated that there was awareness and information available to investigators. Ultimately, however, their main concerns regarding the application of polygraph as discussed in Theme Five, deterred optimal present and future use. Unless these concerns were effectively addressed in the SAPS, as well as by the polygraph

fraternity in South Africa, in the foreseeable future, investigators within the SAPS would be reluctant to optimally use the polygraph.

Emanating from this study, it could be determined that it was not the lack of awareness and/or knowledge regarding the availability and use of polygraph that deterred its optimal use. Rather, it was genuine and universal concerns regarding accuracy, as well as the legality and acceptance of polygraph in the South African Criminal Justice System. The reality was that investigators wanted an investigative aid that provided tangible evidence which was accepted by a criminal court, as it was ultimately the goal of an investigator to solve cases that secure a conviction.

4.10 SUMMARY

The findings of this study sought to answer the central question, which was fixated on determining the perceptions and experiences of the SAPS investigators regarding polygraph as a diagnostic tool in criminal investigations within the context of the South African law enforcement community.

It was the intention of this study to determine the extent to which polygraph was being used as an investigative aid in criminal cases that are investigated by investigators within the SAPS. Emanating from the analysis of the empirical data, six themes were identified.

Theme One outlined the experiences of IOs in the SAPS, by identifying the types of cases that were generally received and investigated. In addition, the resources that were available and accessible to the IOs were also discussed. Fingerprint analysis, ballistics and DNA analysis were determined to be the most sought after resources. The fundamental reason for these disciplines being at the top of the list of resources, was that they are internationally recognised and universally accepted in court proceedings, although, as with all evidence, they may be challenged and/or disputed by the defence.

Theme Two tapered the study to specially focus on the use of polygraph in the SAPS. IOs had expressed mixed reactions regarding the use of the polygraph. It was evident,

however, that IOs who used the polygraph at their own discretion, and, owing to their own initiative to determine if and when polygraph examinations were required in an investigation, had positive experiences regarding the application of polygraph. There were no unfulfilled expectations of the polygraph, as they had an understanding of the capabilities as well as the vulnerabilities and limitations of the polygraph. In contrast, IOs who pursued the use of the polygraph only when requested by their commanders, expressed a sense of disillusion regarding the application of polygraph examinations. As a result, IOs using the polygraph as part of their own decision-making process used it more regularly than investigators who used it reluctantly.

Theme Two also focused on the types of cases whereby polygraph examinations were requested. The findings reflected that polygraph was predominantly used in theft and robbery cases. This finding was corroborated by a South African study conducted by Watson (2011:48-72) in which it was described at length that polygraph tests were mainly conducted in relation to theft-related cases in the private sector.

Having ascertained the extent to which, and types of cases in which, polygraph was used, the study attempted to identify whether polygraph had an impact on criminal investigations. This was determined in Theme Three, as the participants were asked to relate positive or negative experiences that they may have encountered using the polygraph. The findings presented data from the participants, which indicated that the polygraph assisted in identifying false cases, identifying suspects, eliminating innocent people from an investigation, guiding an investigation, obtaining new information and/or leads to pursue, and, occasionally, obtaining confessions or admissions. In contrast to the positive experiences related, there were also IOs who highlighted the negative impact, by describing the polygraph as being 'unhelpful'.

As postulated by Nelson (2016:74), polygraph results, as with any other test results, cannot be expected to be perfect. There were many factors that can have an influence on polygraph examinations. Factors to consider included, but were not limited to, the suitability of the examinee, the competence of the polygraph examiner and the correct procedures in terms of the administration of the test. Nelson (2015:27), however, conceded that there were only a small percentage of random testing errors, and it was unrealistic and unscientific to expect the perfect polygraph examination all the time. It

was, therefore, important to educate and empower IOs regarding the capabilities and limitations of polygraph examinations, to avoid frustration and disillusion when reality could not be reconciled with unrealistic expectations.

Theme Four deliberated the sustainability of polygraph in the SAPS by discussing its usefulness and viability as an investigative aid. Polygraph was described as ‘an aid to assist in investigations’ and ‘useful’ especially in housebreaking and theft cases, revealing false cases, and in departmental cases where firearms were reported lost or stolen. Flowing from the discussion on the usefulness of the polygraph, Theme Four further highlighted concerns expressed by IOs regarding the application of polygraph in criminal investigations. The main concerns were, that polygraph examinations were voluntary, and the inadmissibility of polygraph in legal proceedings. These concerns were raised by both IOs who used the polygraph, as well as non-users of polygraph – as reflected in Theme Five. In Theme Five, the participants who were non-users of polygraph highlighted a number of reasons why polygraph was not an investigative aid of choice. Although the non-users of polygraph were exposed to polygraph by way of media, presentations, or personally submitting to polygraph examinations, it was articulated in Theme Six that many IOs were, nevertheless, not enthusiastic, regarding the use of polygraph as an investigative aid.

In essence, this study determined that the concerns as identified in Theme Four and Theme Five, respectively, regarding the application of polygraph, deterred optimal present and future use. Some concerns were universal to both users and non-users of polygraph. Investigators within the SAPS were very concerned about accuracy rates and the admissibility of polygraph evidence in court. Unless these concerns were effectively addressed in the SAPS, as well as by the polygraph fraternity in South Africa, in the foreseeable future, investigators within the SAPS will remain averse to use the polygraph.

In the final chapter that follows, a summary, recommendations and conclusion are presented.

Chapter 5

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

In the preceding chapter, the findings that emanated from the empirical stage of the study were presented and discussed. In this final chapter, an overview of the study, a summary, recommendations and conclusion are presented. Recommendations were suggested to facilitate a better understanding of polygraph within the law enforcement community, which could enhance its role and value in criminal investigations, specifically within the SAPS. Often the media and the general public have propagated the image of polygraph as being untrustworthy and inaccurate. This depiction of polygraph was not necessarily an accurate interpretation regarding the use of polygraph. This study, therefore, concentrated on exploring the application of polygraph examinations by investigators in the SAPS as a valuable investigative aid in criminal investigations.

While polygraph examinations were in use in South Africa for almost forty years, to date there was limited research and critical debate nationally. It was envisaged that this study would help to improve the understanding of how polygraph was used by SAPS investigators, its utility and success, and would highlight possible stumbling blocks. This was achieved by answering the key research question and sub-questions. The key research question was the following: "What are the perceptions and experiences of the SAPS investigators regarding the polygraph as a diagnostic tool in criminal investigations in the context of the South African law enforcement community?"

The sub-questions were the following:

- What is the status of the current theoretical basis of polygraph examinations internationally and in South Africa?
- What is the current status of polygraph application in the South African Criminal Justice System?

- Are polygraph examinations effectively utilised by the SAPS investigators as an investigative tool in criminal investigations?
- Is/has polygraph been effective in solving criminal cases within the context of the SAPS?
- What are the potential shortcomings that have been identified with regard to the application of polygraph in criminal investigations within the SAPS context?

5.2 SYNOPSIS OF THE STUDY

The first chapter presented an outline of the study by delineating the justification and need for such a study, the research questions, clarification of key concepts, and the research framework. A fundamental purpose of this study was to add to the research on polygraph in South Africa, specifically within the SAPS. For more than two decades, polygraph has been promoted as an investigative aid for IOs within the SAPS, but there have never been any studies, research initiatives or investigations conducted within the organisation (SAPS) to determine whether polygraph has proved to be a viable and beneficial investigative aid as advocated. Based on the findings presented, it was also an aim of this study to make recommendations as to how polygraph can be used optimally in criminal investigations within the SAPS.

Existing literature on the polygraph from various international and national sources was reviewed in Chapter 2 to answer the sub-questions, namely those related to the status of the current theoretical basis of polygraph examinations internationally and in South Africa, and to determine the current status of polygraph application in the South African Criminal Justice System. It was deemed relevant to understand the background, polygraph theory, polygraph procedure, and also the purpose of polygraph examinations. The literature quest focused on the use of polygraph internationally, before concentrating on South Africa. The literature search consequently exposed the lack of South African literature and studies pertaining to the use of the polygraph. It was further apparent that there was an absence of information or research initiatives by the law enforcement community.

Polygraph was used by the SAPS as an investigative tool for the past 20 years. In all these years, the SAPS, except for the study by Martin (2001) had never investigated the feasibility or impact of polygraph use in the Criminal Justice System. There were also no initiatives towards any kind of legislation, regulations or guidelines relating to the application of the polygraph in South Africa. There have, however, been several CCMA and Labour Court rulings regarding the use of the polygraph, which were highlighted and discussed in section 2.13, although it fell outside the realms of this study. It was, therefore, not known, based on the existing available literature, whether the polygraph was a useful and viable investigative tool in criminal investigations within the SAPS.

Chapter 3 delineated the research plan, measures to ensure trustworthiness, ethical measures, data collection techniques and data analysis strategies to investigate the perceptions and experiences of investigators in the SAPS regarding the application of the polygraph as an investigative aid. The qualitative approach was used because it was flexible and therefore appropriate, as this study delved into an area that was not necessarily transparent to a person outside the polygraph and law enforcement fraternity.

The research design selected was grounded theory, as it was generally used when there was a scarcity of information regarding the subject matter under investigation. In addition, the study went beyond giving an account or thematic illustration of the views and opinions of the participants as was the norm in other qualitative research approaches. Essentially, the grounded theory approach constructed a theory that was embedded in the data. In this study, data was generated by way of semi-structured interviews. The initial data collected was done so that a variety of perspectives on the subject matter could be obtained. Thereafter, using constant comparisons, categories of information were analysed. Data was collected until the categories of information were saturated. At this juncture the central themes established a narrative, and outlined an interim matrix that indicated the social and historical situation as well as concerns that influenced the subject matter.

In order to answer the last three sub-questions, namely whether polygraph examinations are effectively used by the SAPS investigators as an investigative tool

in criminal investigations, to determine whether polygraph has been effective in solving criminal cases within the context of the SAPS, and, to identify the potential shortcomings regarding the application of polygraph in criminal investigations within the SAPS context, Chapter 4 presented and discussed the findings emanating from the empirical phase of the study. This was to determine whether polygraph was indeed a valuable investigative conduit, as emphasised in the reviewed international research.

5.3 OVERVIEW OF THE FINDINGS

The findings emanating from this study were presented and discussed in Chapter 4. As a result of the gathering and subsequent data analysis, it was deduced that although polygraph was used by some investigators, and it demonstrated in some cases to be a useful and meaningful investigative aid, the concerns as identified in themes Four, Five and Six, respectively, deterred optimal present and future use. These concerns that were grounded in the data were universal to both users and non-users of polygraph. IOs in the SAPS expressed grave concerns regarding the accuracy, legality and admissibility of polygraph evidence in criminal proceedings.

It was advanced by Strauss and Corbin (1998:22) that a theory was “a set of well-developed categories that are systematically related through statements of relationship to form a theoretical framework that explains some relevant social or other phenomenon”. The theory emanating from this study was thus that most investigators do not see the value and viability regarding the application of polygraph in assisting in criminal cases, as polygraph was not admissible in court. Unless these apprehensions were adequately and decisively addressed in the SAPS, as well as by the polygraph fraternity in South Africa, IOs within the SAPS would continue being reluctant when it comes to the use of the polygraph.

5.4 RECOMMENDATIONS

As stated by Hofstee (2010:159), if a study had potential practical implications, as with this study, it was advantageous to integrate recommendations which were achievable and could add potential value, in the final chapter of the research paper. Emanating from the analysed data and findings presented in this study, the following

recommendations, that could add value to polygraph usage within the SAPS, were presented for possible consideration. This could facilitate optimal use of polygraph examinations in the SAPS, as it was abundantly clear from the findings of this study that polygraph was neither optimally nor consistently used. Grounded in the data, the fact that polygraph had no legal status, had no regulations, and that there were no guidelines as to how polygraph may be used in court, proved to be the stumbling blocks deterring optimum use.

5.4.1 Legislation

As a result of the deeply concerning high levels of crime, and the need for different, effective and innovative ways to combat and deter crime, it was innocuous to say that polygraph was here to stay. It was therefore time that the use of the polygraph must regulated, and guidelines entrenched that adequately addresses the various concerns that have been expressed throughout the years by academics as well as the general population.

In the US, for instance, the use of the polygraph was regulated by the Employee Polygraph Protection Act (EPPA), which came into law in December 1988. The EPPA was implemented to regulate and restrict the use of polygraph for pre-employment and employee security screening purposes within the private sector in the US. It further implemented guidelines for polygraph testing, and levied restrictions on the vast majority of private employers. Only commercial businesses were impacted by the EPPA, as local, federal and state governmental agencies, as well as policing agencies, were not affected (APA, 2018b:np; Scheithauer & Kalula, 2008:111; Krapohl et al, 2012:31). In addition, presently, in the US, 28 jurisdictions have State Licencing Boards that legalise and standardise polygraph testing and the polygraph industries in the states concerned (APA, 2018b:np).

In South Africa, the US legislation should be used as a benchmark for the establishment of legislation, regulations and guidelines regarding the application of polygraph. This would legitimise the application of polygraph, and consequently warrant regulations that could contribute to a national and legitimate standard in terms of the application of polygraph.

5.4.2 Enhanced communication

The SAPS, as well as many other policing agencies worldwide that use the polygraph, advocated the use of polygraph as a diagnostic aid and not as forensic evidence to be presented in legal proceedings. Presently, the application of a polygraph examination in criminal investigations was not a necessity. It was therefore important that IOs in the SAPS understood how polygraph could be an effective, feasible and beneficial investigative aid. This was achievable by enhanced and effective communication. In the US, for instance, the APA published a journal and magazine on a quarterly basis. The journal published research conducted by members and academics of the polygraph fraternity. The quarterly magazine, on the other hand, published news and articles for and by polygraph examiners (APA, 2020:np). In an environment such as the SAPS, where polygraph was still to find its place among IOs, the polygraph capacity within the SAPS had to acknowledge that in order for polygraph to be optimally used, the value, benefits and notable successes of polygraph examinations in criminal investigations had to be effectively communicated to IOs.

Rather than generic presentations from time to time at awareness sessions, it was imperative that noteworthy successes as to the role polygraph played in criminal investigations, were communicated to all IOs consistently. This would enable IOs to gain a better understanding as to how polygraph could have a positive impact in criminal investigations. It is proposed that this may be achievable by way of a biannual newsletter or magazine which can address various issues, for instance, the application of polygraph, successes related to the use of polygraph, and IOs' experiences using polygraph as an investigative aid. Additionally, IOs should be allowed the opportunity to submit concerns or questions that can be shared and discussed. It is therefore envisaged that effective communication and interaction with IOs can have a positive impact on the application of polygraph as an investigative aid within the SAPS.

5.4.3 Development of a concise database

A database was a collection of interrelated data that was stored in a manner that enabled the retrieval of information as and when needed (Morley & Parker 2015:5). It

is envisaged that a database should be maintained to ensure the availability of information and data accuracy regarding polygraph.

Within the polygraph environment in the SAPS, a database that encompassed the following information existed and captured the following information, as reflected in Table 5.1:

Table 5.1: Summary of present database

Polygraph tests finalised: DI (deception indicated) results vs. status of investigations							
Date case file finalised	Station	CAS	Laboratory number (Reference number)	Crime	Number of tests conducted	DIs	Date and manner of closure

With regard to the present database, the following gaps were identified:

- NDI (no deception indicated) results were not included.
- Cases where false positives and false negatives were identified are excluded.

It is recommended that the NDI results, false positives and false negatives be incorporated into the database. In addition, the results should include the following information to determine the authenticity of the results:

- To confirm a DI, the DI person must have admitted to lying in one or more relevant question/s, the person must have made admissions, or there must be corroborating evidence linking the polygraphed individual to the case.
- To confirm an NDI, the individual is cleared of all allegations by independent corroborating evidence by way of some form of physical or tangible evidence and/or the apprehension and conviction of the correct suspect.

- False positives and false negatives that have been identified based on interaction, follow-up and/ or feedback from the IO, should be available so that the case can be dissected, analysed and discussed during training interventions or peer interaction sessions in detail to identify the challenges/shortcomings that led to the incorrect result. This would enable polygraph examiners to learn from mistakes, and in future provide an enhanced and transparent service to IOs.

The relevance of a detailed database is that it would provide a concise, transparent and holistic view of the usage of polygraph. In addition, it would be able to highlight, at a glance, whether polygraph is beneficial as an investigative aid, and this would assist the SAPS in formulating strategies to encourage the optimal use of polygraph as an investigative aid among IOs.

5.4.4 Best practices

Emanating from this study, it was determined that despite polygraph not being used extensively or optimally in the SAPS as an investigative aid, it was, nevertheless, a beneficial and viable diagnostic aid that had assisted in various instances, as identified in the findings. In order to ensure optimum use, it is proposed that the SAPS look at the best practices of other policing agencies that use and advocate the polygraph as an investigative aid. Different policing agencies around the world experience challenges unique to them. During the reviewing of existing literature, the experiences regarding the application of polygraph as used in South Korea, stood out.

5.4.4.1 South Korea

In South Korea, polygraph examinations were primarily used for criminal and road traffic accident cases. According to a Korean National Police White Paper in 2004, 56 percent of the polygraph examinations were for road traffic accident investigations, while only 44 percent were conducted in criminal cases. The polygraph examinations involving road traffic accidents in South Korea, which could be considered unique, and was not widely used elsewhere, were introduced in 1995. There had been a demand from the public for a scientific investigation of road traffic accidents. The public wanted the police to be fair and objective when making a decision as to which party was

responsible – in other words, who had caused the accident. Since 1995, it was decided by the Korean National Police that all drivers involved in road traffic accidents would be subjected to polygraph examinations. Since then, hostile disagreements and arguments between the parties involved have been significantly reduced. Although 18 percent of the polygraph examinations in these cases were rendered as inconclusive, about 44 percent of road traffic accident polygraph examinations culminated in a confession prior to the polygraph examination in-test phase (Lee, 2010:17).

The South Korean example highlights that polygraph examinations could be used in different contexts and in unique situations. The law enforcement community, academics and polygraph examiners in South Africa should take the time, and make a concerted effort, to investigate how polygraph can be optimally used to combat and prevent the high levels of crime currently being experienced. Engaging in work studies and peer review sessions to determine how polygraph is used by other police agencies would contribute to the optimal use of polygraph within the SAPS environment.

5.4.5 Research and development

As highlighted in this study, within the polygraph environment, and particularly within the law enforcement community, there was a lack of research. It would be advantageous for polygraph examiners, predominantly from the law enforcement community, to engage in forums/sessions where there could be a cross-pollination of ideas and information regarding the application of polygraph in the criminal justice environment. Despite advancement in the use of polygraph in the private and public spheres in South Africa, there had been ongoing concerns regarding validity, accuracy, legality and admissibility as raised in this study, as well as by previous research and articles. These concerns should not, and can no longer, be ignored, and in order to ensure optimum use, the recommendations suggested should be considered.

Deriving from this study, it is suggested that additional research be pursued in the ensuing areas:

- The evidentiary role and probative value that polygraph examination results can play in criminal proceedings in the South African legal system.

- The prevalence and impact of countermeasures in polygraph examinations – a South African study.
- A South African study focusing on whether language, educational and cultural differences play a role in, or have an impact on, polygraph examinations.

5.5 CONCLUSION

The use of polygraph examinations, more than a century later, remained provocative and controversial. As reflected in this study, there was a substantial amount of international literature relating to polygraph, ranging from studies on validity and reliability to the various polygraph techniques. There was also research to determine the accuracy of different types of polygraph techniques predominantly used in criminal investigations. Internationally, the US may be regarded as the benchmark in terms of polygraph use, development, research, legislation and admissibility in legal proceedings. In other countries where polygraph was used, despite an absence of legislation, the issue regarding the admissibility of polygraph evidence had been deliberated as highlighted by the Supreme Courts of Australia and Canada, where the unswerving stance was that such evidence was inadmissible (Elton, 2017:69).

Notably, emerging from the findings of this study, the most significant concern expressed by IOs was the inadmissibility of polygraph evidence in criminal proceedings. Although the use of polygraph in the private and law enforcement sectors had seen an upsurge in the past twenty years, research, development, legislation and guidelines continue to be absent. It was highlighted by Prinsloo (2007:39) that no legislation had by then been promulgated by parliament, nor had there been any decision made by any court that forbade the use of the polygraph. Furthermore, to date, there were no judgements made by any court, nor were there any legal precedents set regarding the admissibility of polygraph examination results. Additionally, there was still no clarity by any court as to how the results of polygraph examinations could or would be utilised, nor had there been any direction given regarding the probative or evidentiary significance of the findings emanating from polygraph examinations.

Within the labour environment, in a considerable quantity of cases referred to the CCMA or the Labour Court, polygraph evidence was either admitted with some weight

attached to it, or it was dismissed as inadmissible. According to Scheithauer and Kalula (2008:110), in instances where polygraph evidence was allowed, the weight of the evidence recognised was attributed to the evidence of the polygraph examiner, as well as the personal beliefs of the presiding officer, and not on any scientific probe into the nature of the polygraph examinations itself. In contrast, there was a significant number of cases whereby it was established that polygraph evidence was unreliable and unscientific, and consequently the evidence was not admitted into evidence.

The data analysis of this study further revealed that one participant considered polygraph to be unconstitutional. Further insight into, and understanding of, the application of polygraph, however, indicated that the following measures were in place to ensure that polygraph use in the SAPS was not in violation of the Constitution:

- The APA Standards of Practice (APA, 2018c:5), as well as the SAPS, made provision that all polygraph examinations were voluntary, meaning that no individual was forced, coerced, threatened or promised anything when it came them submitting to the test.
- Consent, which had to be in writing, had to be obtained from the individual subjected to a polygraph examination. Consent had to be obtained at the beginning of the polygraph examination, as specified in the APA Standards of Practice (APA, 2018c:5).
- The APA code of ethics and procedures specified that all individuals who submitted to a polygraph examination had to be treated in a manner that was dignified and respectful. The dignity of an individual should not be violated, as ethical polygraph procedures promote respect for human rights and the privacy of the individual submitting to a polygraph test (APA, 2018a:7).
- Individuals who submitted to a polygraph examination conducted by an SAPS polygraph examiner were informed of their rights in terms of section 35 of the Constitution of 1996. In essence, all examinees were informed of their right to be silent, as they were not forced to answer any questions put forth to them by the polygraph examiner. Examinees were also warned that anything they said was recorded in writing and by video-recording. In addition, examinees were advised of their right to seek advice from a legal representative regarding the decision to submit to a polygraph examination.

It could therefore be argued that within the SAPS, every effort not to violate the rights of an individual in terms of the Constitution, was being made. An issue that required clarity and further debate, however, was the admissibility of confessions that were made to polygraph examiners in criminal proceedings. From time to time, polygraph examiners elicited confessions from examinees, be it before, during or after a polygraph examination. The question that one was consequently compelled to ask was whether confessions made to a police polygraph examiner was admissible in a legal proceeding. As discussed in section 2.14.1, in South Africa, Section 217 of the Criminal Procedure Act specified the requirements for the admissibility of a confession in the South African criminal courts, as highlighted by Joubert (2010:322-326):

- If a confession was made to a private person, justice of the peace or magistrate, it did not have to be in writing.
- However, if a confession was made to a peace officer, who was neither a justice of the peace nor a magistrate, then the confession had to be obtained in writing and confirmed before a magistrate or justice of the peace. This was to afford the accused some protection, because compelling them to be taken to an objective official guaranteed that the accused was not pressurised into making a confession. This therefore ensured that the statement was made freely and voluntarily. A commissioned officer (a police officer with the rank of Captain or higher), who was not the investigating officer or part of the investigation, could also take down a confession.

Generally, most polygraph examiners in the SAPS forensic science environment were commissioned officers who were eligible to obtain confessions. This, however, would be considered a challenge in terms of section 217 of the Criminal Procedure Act of 1977, as a commissioned officer who obtained a confession should neither be an investigating officer nor part of the investigation. Consequently, it could be argued that a SAPS polygraph examiner in the forensic science environment was not an objective official to obtain a confession from an examinee. The polygraph examiner became part of the investigation as soon as the request for the polygraph test was received. The merits of the case were discussed with the polygraph examiner, so that there could be proper preparation for the ensuing polygraph examination.

If the polygraph examiner was entwined with the investigation from the onset of the request, it could be argued that the polygraph examiner was not an independent, objective official when a confession was made. As a result, any confession made before, during or after a polygraph examination to a police polygraph examiner in the forensic science environment, would not be admissible in a criminal trial. It was therefore the sentiment of the researcher of this study, that eliciting confessions should not be the end goal of a polygraph examination. A confession should rather be considered a possible result of a polygraph examination.

It was thus essential that IOs understood that if polygraph was used for the sole purpose of obtaining confessions, it could have an adverse impact on their case, implying that during a criminal trial, the confession could be challenged and may consequently be ruled inadmissible. This study, therefore, concurred with Prinsloo (2007:39), who accentuated that polygraph should be advocated and used as an investigative aid to gather more information that could assist an investigation, or as supporting evidence that could augment the probative value and weight of the other circumstantial evidence that was be available.

This study highlighted that polygraph did indeed serve as a viable investigative aid, as it was not advocated or intended to provide indisputable forensic evidence in a legal proceeding. It nevertheless still raised the question as to whether polygraph was optimally used by SAPS investigators as an investigative tool in criminal investigations. Emanating from this study, it was clear that the polygraph was not being optimally used. The main reasons were based on the concerns highlighted by the participants (users and non-users of polygraph), as discussed in Theme Four, section 4.7.2 and Theme Five, section 4.8 respectively.

The use of the polygraph in South Africa was controversial, but its usage had gained significant momentum in recent years. In many other countries, including South Africa, where polygraph was used, its value was emphasised as an investigative aid, and it was not advocated to be presented as indisputable forensic evidence in legal proceedings. As stated by Gordon (2017:xi), polygraph had the ability to take an investigator where no other investigative aid could infiltrate, namely the mind of a suspect. It was further proclaimed by Gordon (2017:xi) that in this era, polygraph was

the “gold standard” for the verification of the truth, as polygraph could play an instrumental role in all types of investigations.

Herbig (2010:97) added that the latent value of polygraph should not be snubbed, nor should it be regarded as a solution to every case. It could play a fundamental role in investigating crime, deterring and apprehending criminals, as well as managing offenders, even though its use continues to be controversial – and distrusted by scientists and academics.

Consequently, this study did indeed highlight the status of the current theoretical basis of polygraph examinations internationally and in South Africa. The current status of polygraph application in the South African Criminal Justice System was also discussed. In the empirical stage of the study, the question of whether polygraph examinations were effectively used by SAPS investigators as an investigative tool in criminal investigations, was also addressed. It was determined that although polygraph was being sought by IOs to assist in investigations, it was not being optimally used, although to some extent it has been effective in solving criminal cases within the context of the SAPS.

It was consequently determined that the shortcomings (concerns) that were identified with regard to the application of polygraph in criminal investigations within the SAPS context, was a stumbling block for optimal use. It was envisaged that legislation and regulations regarding the application of polygraph in South Africa would add to the legitimacy and credibility of polygraph usage, particularly within the law enforcement community, namely the SAPS. Furthermore, neglecting research within the law enforcement environment undermined the value and potential that polygraph examinations could add to investigations, and should therefore be addressed to ensure the optimal use of polygraph as an investigative aid in criminal investigations.

REFERENCES

Alder, K. 2007. *The lie detectors, The history of an American obsession*. New York: Free Press.

Aleksandras, K. & Saldžinas, V. 2014. Are polygraph examinations helpful in criminal investigation cases? *European law enforcement bulletin research bulletin*, 9:12-17.

American Polygraph Association. 2012. Model policy for the evaluation of examinee suitability for polygraph testing. *Polygraph*, 41(4):205-208.

American Polygraph Association. 2014a. *APA bylaws*. Available at: <http://www.polygraph.org> (accessed on: 10 June 2014).

American Polygraph Association. 2014b. Brief of Amicus submitted to the Alaska Court of Appeals. *Polygraph*, 43(2):1-49.

American Polygraph Association. 2017. *APA bylaws*. Available at: <http://www.polygraph.org> (accessed on: 3 January 2018).

American Polygraph Association. 2018a. *APA bylaws*. Available at: <http://www.polygraph.org> (accessed on: 3 January 2019).

American Polygraph Association. 2018b. *Resources: State Licencing Boards*. Available at: <http://www.polygraph.org> (accessed on: 1 February 2019).

American Polygraph Association. 2018c. *Standards of practice*. Available at: <http://www.polygraph.org>. (accessed on: 3 January 2019).

American Polygraph Association. 2019. *Standards of practice*. Available at: <http://www.polygraph.org>. (accessed on: 1 December 2020).

American Polygraph Association. 2020. *Standards of practice*. Available at: <http://www.polygraph.org>. (accessed on: 1 December 2020).

Amsel, T.T. 2015. Where there is doubt, there is freedom. *APA Magazine*. 48(2):32-34.

Anderson, V. 2013. *Research methods in human resource management: Investigating a business issue*. Third edition. Wimbledon: Chartered Institute of Personnel and Development. (CIPD Publications.)

APA see American Polygraph Association.

Aspers, P. & Corte, U. 2019. What is qualitative in qualitative research? *Qualitative Sociology*. 42:139-160.

Babbie, E.R. 2017. *The basics of social research*. Seventh edition. Boston, MA: Cengage Learning.

Babbie, E.R. & Benaquisto, L. 2010. *Fundamentals of social research*. Second edition. Toronto: Nelson Education.

Babbie, E.R. & Mouton, J. 2001. *The practice of social research*. Cape Town: Oxford University Press Southern Africa.

Babbie, E.R. & Mouton, J. 2012. *The practice of social research*. Eighth edition. Cape Town: Oxford University Press.

Bersh, P.J. 1969. A validation study of polygraph examiner judgements. *Journal of Applied Psychology*. 53(5):399-403.

Birks, M. & Mills, J. 2011. *Grounded theory: A practical guide*. Los Angeles, CA: Sage.

Blignaut, C. 1998. Even white lies stand no chance. *Argus*, 15 August 1998:7.

Bouma, G.D., Ling, R. & Wilkinson, L. 2012. *The research process*. Second edition. Ontario: Oxford University Press.

Brown, R.M. & Davenport, J.S. 2012. *Forensic Science: Advanced investigations*. Mason: South Western Cengage Learning.

Bradley, M.T., MacLaren, V. & Carle, S.B. 2014. Deception and non-deception in guilty knowledge and guilty actions polygraph tests. *Polygraph*, 43(4):148-154.

Bryant, A. 2017. *Grounded theory and grounded theorizing. Pragmatism in research practice*. New York: Oxford University Press.

Bryant, A. & Charmaz, K. 2007. Grounded theory in historical perspective: An epistemological account. (Pp. 31-58). In A. Bryant & K. Charmaz (eds). *The Sage handbook of grounded theory*. London: Sage.

Bryman, A. & Bell, A. 2015. *Business research methods*. Fourth international edition. London: Oxford University Press.

Brynard, D.J., Hanekom, S.X. & Brynard, P.A. 2014. *Introduction to research*. Third edition. Pretoria: Van Schaik.

Bull, R., Baron, H., Gudjonsson, G., Hampson S., Rippon, G. & Vrij, A. 2004. *A review of the current scientific status and fields of application of polygraphic deception detection*. London: British Psychological Society.

Calaca, D.F. 2010. The use of polygraph tests and related evidentiary aspects in labour disputes. Unpublished LLM (labour law) dissertation, University of Pretoria, Pretoria.

Calman, L. 2006. *What is grounded theory?* Available at: <http://www.methods.manchester.ac.uk/events/whatis/gt.pdf> (accessed on: 16 November 2018).

Canter, D. & Žukauskien, R. 2008. *Psychology and law: Bridging the gap*. Aldershot, Hants.: Ashgate Publishing.

Charmaz, K. 2006. *Constructing grounded theory: A practical guide through qualitative analysis*. London: Sage.

Charmaz, K. 2014. *Constructing grounded theory*. Second edition. Thousand Oaks, CA: Sage.

Charmaz, K., Thornberg, R., & Keane, E. 2018. Evolving grounded theory and social justice inquiry. In N.K Denzin & Lincoln, Y.S (eds). *The Sage handbook of qualitative research*. London: Sage.

Cilliers, C.H. & Martin, R.C. 2002. The polygraph: Friend and ally of private industry yet cautious guest of the criminal justice system (1). *Acta Criminologica*, 5(3):134-140.

Claasens, J. 1997. *Establishment of a polygraph unit in the National Detective Services, Training of Polygraph Examiners and Acquisition of Polygraph Instruments and Equipment*. [SAPS: Internal declassified document].

Collier, D. 2001. Truth or dare? What lies beneath the polygraph test? *De rebus*, 2001(402):24-26.

Commission for Conciliation, Mediation and Arbitration Information Sheet. 2002. Polygraph testing. Available at: <https://www.cma.org.za/Advice/Information-sheet> (accessed on: 23 February 2018).

Constitution ... 108 of 1996 see South Africa. 1996.

Cooper, D.R. & Schindler, P.S. 2014. *Business research methods*. Twelfth edition. Boston: McGraw-Hill.

Cooper, S.L. 2016. Challenges to fingerprint identification evidence: Why the courts need a new approach to finality. *Mitchell Hamline Law Review*, 42(2):756-790.

Corbin, J. & Strauss, A. 1990. Grounded theory research: Procedures, cannons & evaluative criteria. *Qualitative Sociology*, 13(1):3-21.

Corbin, J. & Strauss, A. 2008. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Third edition. Thousand Oaks, CA: Sage.

Corbin J. & Strauss, A. 2015. *Basics of qualitative research techniques and procedures for developing grounded theory*. Fourth edition. Los Angeles, CA: Sage.

Cossy, L.S. 2014. *Transition and thriving in university: A grounded theory of the transition experiences and conceptions of thriving of a selection of undergraduate students at Western University*. Electronic Thesis and Dissertation Repository, 2531. Available at: <http://ir.lib.uwo.ca/etd/2531> (accessed on: 14 November 2018).

Creswell, J.W. 2009. *Research design: Qualitative, quantitative and mixed methods approaches*. Third edition. Thousand Oaks, CA: Sage.

Creswell, J.W. 2014. *Research design*. Fourth edition. London: Sage.

Creswell, J.W. & Creswell, J.D. 2018. *Research design, qualitative, quantitative and mixed methods approaches*. Fifth edition. Thousand Oaks: Sage.

Creswell J. & Clark, V.L.P. 2007. *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Cropley, A.J. 2019. *Introduction to qualitative research methods*. Second revised edition. Riga, Latvia: Zinatne.

Davies, P., Francis, P. & Jupp, V. 2011. *Doing criminological research*. Second edition. London: Sage.

De Paulo, B.M., Kashy, D.A., Kirkendol, S.E., Wyer, M.M. & Epstein, J.A. 1996. Lying in everyday life. *Journal of Personality and Social Psychology*, 70(5):979-995.

De Paulo, B.M., Malone, B.E., Lindsay, J.J., Muhlenbruck, L., Charlton, K. & Cooper, H. 2003. Cues to deception. *Psychological Bulletin*, 129(1):74-118.

De Vos, A.S., Strydom, H., Fouché, C.B. & Delport, C.S.L. 2011. *Research at grassroots for the social sciences and human service professions*. Fourth edition. Pretoria: Van Schaik.

Denzin, N.K. 2001. *Interpretative interactionism*. Second edition. Thousand Oaks, CA: Sage.

Denzin, N.K. & Lincoln, Y.S. 1994. *Handbook of qualitative research*. Thousand Oaks, CA: Sage.

Department of Justice, South Africa. 1994. National Strategic Intelligence Act 39 of 1994. *Government Gazette*, 354(16128). Pretoria. Government Printer.

Department of Justice, South Africa. 1997. Criminal Procedure Act 51 of 1997. Available at: <http://www.justice.gov.za/legislation/acts/1977-051.pdf> (accessed on: 10 July 2016).

Department of Justice, South Africa. 2002. Intelligence Services Act 65 of 2002. *Government Gazette*, 452(24390). 13 February 2003. Pretoria: Government Printer.

Edmonds, W.A. & Kennedy, T.D. 2017. *An applied guide to research designs. Quantitative, qualitative and mixed methods*. Second edition. London: Sage.

Elton, J. 2017. The polygraph in the English courts: A creeping inevitability or a step too far? *Journal of Criminal Law*, 8(1):66-79.

Eterno, J.A. 2012. A brief history of criminal investigation. In M.L. Birzer & C. Roberson (eds). *Introduction to criminal investigation*. New York: CRC Press.

Farrell, S. 2016. *Field studies*. Available at: <https://www.nngroup.com/articles/field-studies> (accessed on: 14 December 2017).

Faull, A. 2017. The South African Police Service's Code of Conduct: A critical review. Mowbray: African Policing Civilian Oversight Forum. (*APCOF Policy Paper No.17*: 1-28).

Federal Examiner Handbook. 2011. Federal psychophysiological detection of deception examiner handbook. Special edition. *Polygraph*, 40(1):1-66.

Fitzgerald, J.D. & Cox, S.M. 1994. *Research methods in criminal justice: An introduction*. Second edition. Chicago: Nelson-Hall.

Flick, U. 2011. *Introducing research methodology: A beginner's guide to doing a research project*. London: Sage.

Flynn, S.V. & Korcuska, J.S. 2018. Grounded theory research design: An investigation into practices and procedures. *Counselling outcome research and evaluation*, 9(2):102-116.

Fraenkel, J.R., Wallen, N.E. & Hyun, H.H. 2012. *How to design and evaluate research in education*. Eighth edition. New York: McGraw Hill.

Friese, S. 2018. *Atlas.ti 8 Windows – user manual – updated for program version 8.3*. Berlin: Atlas.ti Scientific Software Development GmbH.

Galiano, J. 2015. Polygraph abroad – destination Canada. *APA magazine*, 48(3):58-64.

Giles, T., King, L. & De Lacey, S. 2013. The timing of the literature review in grounded theory research: An open mind versus an empty head. *Advances in Nursing Science*, 36(2):E29-40.

- Glaser, B.G. 1998. *Doing grounded theory: Issues and discussions*. Mill Valley, CA: Sociology Press.
- Glaser, B.G. 2001. *The grounded theory perspectives: Conceptualization contrasted with description*. Mill Valley, CA: Sociology Press.
- Glaser, B.G. & Strauss A.L. 1967. *The discovery of grounded theory*. Chicago, IL: Aldine.
- Gordon, N.J. 2017. *Essentials of polygraph and polygraph testing*. London: CRC Press.
- Gordon, N.J. & Fleisher, W.L. 2011. *Effective interviewing and interrogation techniques*. Third edition. Boston: Elsevier.
- Gougler, M., Nelson, R., Handler, M., Krapohl, D., Shaw, P. & Bierman, L. 2011. Report of the Ad Hoc Committee on Validated Techniques. *Polygraph*, 40(4):203-305.
- Graham, F. 2014. *Fingerprints and expert identification evidence: Markers of unreliability*. Available at <http://criminalcpd.net.au/wp-content/uploads/2017/01/fingerprints-and-expert-identification-evidencewithpostscript.pdf> (accessed on: 30 November 2018).
- Granhag, P.A. & Strömwall, L.A. 2004. *The detection of deception in forensic contexts*. Cambridge: Cambridge University Press.
- Gross, S.R., Possley, M., & Stephens, K. 2017. Race and wrongful convictions in the United States. *The National Registry of Exonerations, Newkirk Centre for Science and Society*. (Pp. 1-37). Available at: <https://repository.law.umich.edu> (accessed on: 15 December 2017).
- Grubin, D. 2010. The polygraph and forensic psychiatry. *Journal of the American Academy of Psychiatry and the Law*, 38(4):446-451.

Grubin, D. 2016. Polygraph testing of sex offenders. *Treatment of sex offenders: Strengths and weaknesses in assessment and intervention. Polygraph*, 45(2):97-112.

Guba, E.G. & Lincoln, Y. 1985. *Effective evaluation: Improving the usefulness of evaluation results through responses and naturalist approaches*. San Francisco, CA: Jossey-Bass.

Guest, G., Namey, E.E. & Mitchell, M.L. 2013. *Collecting qualitative data: A field manual for applied research*. Thousand Oaks, CA: Sage.

Guthrie, G. 2010. *Basic research methods. An entry to social science research*. New Delhi: Sage.

Haber, L. & Haber, R.N. 2004. Error rates for human latent fingerprint examiners. (Pp. 339-360). In N.K. Ratha (ed). *Advances in Automatic Fingerprint recognition systems*. New York: Springer-Verlag.

Hale, N. 2008. *Perceptions and law enforcement*. School of Law Enforcement Supervision session xxxii. Little Rock, AR: Criminal Justice Institute.

Handler, M. 2016. Editor's corner. *APA magazine*. 49(1):5-10.

Handler, M., Honts, C. & Blalock, B. 2015. A literature review of polygraph: Countermeasures and the comparison question technique. *APA magazine* 48(3):81-96.

Handler, M., Honts, C. & Goodson, W. 2015. A literature review of polygraph countermeasures and the comparison question technique. *Polygraph*, 44(2):129-139.

Hanekom, B.D. 2016. *Forensic Polygraph Induction Programme learner guide*. SAPS v 2.0. [SAPS: Internal document used in the Polygraph Section].

Hanekom, B.D. 2020. *Forensic Polygraph Induction Programme learner guide*. SAPS [SAPS: Internal document used in the Polygraph Section].

- Harding, J. 2013. *Qualitative data analysis: From start to finish*. London: Sage.
- Heathfield, L.J. 2013. Policy required for entry of DNA profiles onto the National Forensic DNA Database of South Africa. *South African journal of science*. 11(7/8):1-3.
- Herbig, F.J.W. 2010. Criminal justice/criminology and forensic psychophysiology: A symbiotic interface. *South African Journal of Criminal Justice*, 23(1):78-97.
- Herbig, F.J.W. 2018. Polygraph screening in the South African workplace: Veracity, verification or victimisation? *Acta Criminologica*, 31(1):54-67.
- Heriot-Watt University. School of Management and Languages. 2015. *A guide to writing your masters dissertation*. Available at: <http://www2.hw.ac.uk/sml/postgraduate/downloads/dissertations/dissertationguide.pdf> (accessed on: 3 October 2015).
- Hess, K.M., Orthmann, C.H. & LaDue, S. 2016. *Management and supervision in law enforcement*. Seventh edition. Boston: Cengage Learning.
- Hoare, K.J., Mills, J. & Francis, K. 2012. Dancing with data: An example of acquiring theoretical sensitivity in a grounded theory study. *International Journal of Nursing Practice*, 18(3):240-245.
- Hofstee, E. 2010. *Constructing a good dissertation: A practical guide to finishing a Masters, MBA or PhD on schedule*. Sandton: EPE.
- Holton, J.A. 2008. Grounded theory as a general research methodology. *Grounded Theory Review*, 7(2):67-93.
- Honts, C.R. 1994. *Field validity study of the Canadian Police College polygraph technique*. Technical report for Canadian Police Research Centre. Grand Forks, ND: C. Honts Consultations.

Honts, C.R. 1996. Criterion development and validity of the control question test in field application. *Journal of General Psychology*, 123(4):309-324.

Honts, C.R. 2004. The psychophysiological detection of deception. (Pp. 103-123). In P.A. Granhag & L. Strömwall (eds). *The detection of deception in forensic contexts*. Cambridge: Cambridge University Press.

Hosken, G. 2012. *Now I'll never know why he killed Sheldean*. Available at: <https://www.iol.co.za/news/crime-courts/now-ill-never-know-why-he-killed-sheldean-233586>. (accessed on: 1 September 2017).

Howitt, D. 2016. *Introduction to qualitative research methods in psychology*. Third edition. London: Pearson Education.

Howitt, D.H. & Cramer, D. 2014. *Introduction to research methods in psychology*. Fourth edition. London: Pearson Education.

Huberman, A.M., Miles, M.B. & Saldana, J. 2014. *Qualitative data analysis*. Third edition. Los Angeles, CA: Sage.

Janušauskas, A. 2014. Dilemma of lies detection in criminalistics research. *Journal of Law and Criminal Justice*, 2(1):137-149.

Joubert, C. 2010. *Applied Law for police officials*. Third edition. Claremont: Juta.

Joubert, G.J. 2005. *A practical approach to polygraph testing in South Africa*. Unpublished MPhil Dissertation. University of Johannesburg, Johannesburg.

Julian, R.D., Kelty, S.F., Roux, C., Woodman, P., Robertson, J., Davey, A., Hayes, R., Margot, P., Ross, A., Sibly, H. & White, R. 2011. What is the value of forensic science? An overview of the effectiveness of forensic science in the Australian Criminal Justice System Project. *Australian Journal of Forensic Sciences*, 43(4):217-229.

Kapardis, A. 2010. *Psychology and law: A critical introduction*. Third edition. Cambridge: Cambridge University Press.

Kassin, S.M., Dror, I.E. & Kukucka, J. 2013. The forensic confirmation bias: problems, perspectives and proposed solutions. *Journal of Applied Research in Memory and Cognition*, 2(1):42-52.

King, N. & Horrocks, C. 2010. *Interviews in qualitative research*. London: Sage.

Kleiner, M. 2002. *The handbook of polygraph testing*. San Diego, CA: Academic Press.

Kolb, M. 2012. Grounded theory and the constant comparative method: Valid research strategies for education. *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)*, 3(1):83-86.

Kondiah, S.S. 2012. Privacy in the workplace: Striking a balance between the privacy concerns of employees and the operational requirements of employers. Unpublished Master of Laws Dissertation, University of KwaZulu-Natal, Pietermaritzburg/Durban.

Krapohl, D.J. 2010. Federal zone comparison technique. *Polygraph References. Lafayette Software Version 11.2.2*. [Lafayette Software LX 4000 in the Reference Section].

Krapohl, D.J. 2013. Polygraph principles: A literature review. *Polygraph*, 42(1):35-60.

Krapohl, D.J. 2015. Common pitfalls in calculating decision accuracy with field cases. *APA magazine*, 48(3):65-70.

Krapohl, D.J & Shaw, P. 2015. *Fundamentals of polygraph practice*. San Diego: Academic Press.

Krapohl, D.J., Handler, M. & Sturm, S. 2012. *Terminology reference for the science of Psychophysiological Detection of Deception*. Third edition. Washington, DC: American Polygraph Association.

Kumar, R. 2011. *Research methodology: A step-by-step guide for beginners*. Third edition. London: Sage.

Kumar, S. 2018. Understanding different issues of unit of analysis in a business research. *Journal of General Management Research*, 5(2):70-82.

Lawrence, J. & Tar, U. 2013. The use of grounded theory technique as a practical tool for qualitative data collection and analysis. *Electronic Journal of Business Research Methods*, 11(1):29-40.

Leavy, P. 2017. *Research design. Quantitative, qualitative, mixed methods, arts-based and community-based participatory research approaches*. New York: The Guilford Press.

Lee, H.C. & Pagliaro, E.M. 2013. Forensic evidence and crime scene investigation. *Journal of Forensic Investigation*, 1(2):1-5.

Lee, Y.H. 2010. Polygraph in South Korea. *Polygraph*, 39(1):15-21.

Leedy, P.D. & Ormrod, J.E. 2013. *Practical research: Planning and design*. Tenth edition. Upper Saddle River, NJ: Pearson Education.

Leedy, P.D. & Ormrod, J.E. 2015. *Practical research: Planning and design*. Eleventh edition. Boston, MA: Pearson Education.

Liamputtong, P. 2013. *Qualitative research methods*. Fourth edition. South Melbourne, Vic.: Oxford University Press.

Lincoln, Y.S. & Guba, E.G. 1985. *Naturalistic inquiry*. Newbury Park, CA: Sage.

Lissitzyn, C.B. 2008. *Forensic evidence in court: A case study approach*. Durham, NC: Carolina Academic Press.

Lyman, M.D. 2011. *Criminal investigation: The art and the science*. Sixth edition. Upper Saddle River, NJ: Pearson Education.

Lyman, M.D. 2013. *Criminal investigation*. Upper Saddle River, NJ: Pearson Education.

Maree, K. & Van der Westhuizen, C. 2009. *Head start in designing research proposals in the social sciences*. Lansdowne: Juta.

Marks, A.G. 2014. Polygraph testing in the South African workplace: The law and practice. Unpublished MPhil Dissertation, University of Cape Town, Cape Town.

Martin, R.C. 2001. The application of the polygraph in the criminal justice system. Unpublished Master of Arts (Penology), University of South Africa, Pretoria.

Matte, J.A. 1996. *Forensic psychophysiology using the polygraph*. New York: J.A.M. Publications.

Matte, J.A. 2000. *Examination and cross-examination of experts in forensic psychophysiology using the polygraph*. New York: J.A.M publications.

Maxfield, M.G. & Babbie, E.R. 2011. *Research methods for criminal justice and criminology*. Sixth edition. Los Angeles, CA: Wadsworth Cengage Learning.

Maxwell, J.A. 2013. *Qualitative research design: An interactive approach*. Third edition. Los Angeles, CA: Sage.

McMahon, M. 2003. Polygraph testing for deception in Australia: Effective aid to crime investigation and adjudication. *Journal of Law and Medicine*, 11:24-47.

McMahon, R.J. 2014. *Practical handbook for professional investigators*. Third edition. New York: CRC Press.

McManus, B.L. 2008. *Liar: The art of detecting deception and eliciting responses*. Leesburg, VA: Global Traveler.

McMillan J.H. & Schumacher, S. 2006. *Research in education: Evidence-based inquiry*. Sixth edition. Boston, MA: Pearson Education.

Meijer, E.H. & Van Koppen, P.J. 2008. Lie detectors and the law: The use of the polygraph in Europe. In D. Canter & R. Žukauskienė (eds). *Psychology and law bridging the gap*. Aldershot, Hants.: Ashgate Publishing.

Memon, A., Vrij, A. & Bull, R. 2003. *Psychology and law: Truthfulness, accuracy and credibility*. Second edition. Chichester, West Sussex: Wiley.

Merriam, S.B. 2009. *Qualitative research: A guide to design and implementation*. San Francisco, CA: Sage.

Merriam, S.B. & Simpson, E.L. 2000. *A guide to research for educators and trainers of adults*. Second edition. Malabar, FL: Krieger Publishing.

Mitchell, R.W. 1986. A framework for discussing deception. In R.W. Mitchell & N.S. Mogdil (eds). *Deception: Perspectives on human and nonhuman deceit*. Albany: State University of New York Press.

Mohajan, H. 2018. *Qualitative research methodology in social sciences and related subjects*. Available at: <http://mpira.ub.uni-muenchen.de/85654> (accessed on: 20 August 2019).

Morley, D. & Parker, C.S. 2015. *Databases and database management systems presentation*. Available at: <http://www.oakton.edu>textPDF> (accessed on: 20 August 2019).

Mothibe, T.T.E. 2013. Challenges in the polygraph testing of workers in South Africa Unpublished MLM (Law) Dissertation. University of Johannesburg, Johannesburg. Available at: <https://ujdigispace.uj.ac.za> (accessed on: 2 January 2019).

Munhall, P.L. & Chenail, R.J. 2008. *Qualitative research proposals and reports: A guide*. Third edition. Boston: Jones & Bartlett Learning.

Murphy J.K. 1996. *SAPS Polygraph Interrogatory*. Washington. [SAPS internal document].

Murphy, V.T. & Pumphrey, J.K. 1996. Polygraphing victims of sex crimes. *APA Magazine*. Tennessee. [SAPS internal document].

National Research Council. 2003. *The polygraph and lie detection*. Washington, DC: National Academies Press.

Nelson, R. 2014. What does polygraph measure? *APA Magazine*, 47(2):39-47.

Nelson, R. 2015. Five-minute science lesson: Types of scientific studies. *APA Magazine*, 48(5):69-72.

Nelson, R. 2015. Five-minute science lesson: Vocabulary primer for classification, inference and scientific polygraph. *APA Magazine*, 48(2):35-39.

Nelson, R. 2015. One-word essay (more or less): What does polygraph measure? *APA Magazine*, 48(2):29-31.

Nelson, R. 2015. Short essay: What is a polygraph? (In 500 words or less). *APA Magazine*. 48(4):91-92.

Nelson, R. 2015. *Testing the limits of admissions*. Paper presented at the 50th Annual APA Seminar of the American Polygraph Association, held in Chicago on 30 August to 5 September 2015.

- Nelson, R. 2016. Testing the limits of evidence-based polygraph practices. *Polygraph*, 45(1):74-85.
- Nelson, R. 2018. Five-minute science lesson: A brief discussion of some causes of testing errors. *APA Magazine*, 51(6):45-46.
- Nelson, R. & Handler, M. 2014. Do test results matter? *APA Magazine*, 47(1):24-25.
- Nelson, R. & Handler, M. 2015. Statistical reference distributions for comparison question polygraphs. *Polygraph*, 44(1):91-114.
- Neuman, W.L. 2003. *Social research methods*. Fifth Edition. Boston, MA: Allyn and Bacon.
- Neuman, W.L. 2014. Seventh edition. *Social research methods: Qualitative and quantitative approaches*. Harlow: Pearson Education.
- Ngoo, D. 2009. Singapore: An overview of history and current developments. *Polygraph*, 38(4):291-293.
- Nienaber, P. 2014. *Opinion on whether polygraph tests are admissible in court*. [SAPS internal document].
- Niziolek, K & Gołębiewska, E. 2018. The perceived validity of the polygraph in Polish criminal courts. *Polygraph and forensic credibility assessment: A Journal of Science and Field Practice*, 47(1):26-32.
- Nortjé, J.G.J. & Myburgh, D.C. 2019. *The search and seizure of digital evidence by forensic investigators in South Africa*. *PER/PERJ* 2019(22). Available at: <http://dx.doi.org/10.17159/1727-3781/2019/v2210.4886> (accessed on: 24 July 2019).
- O'Leary, Z. 2017. *The essential guide to doing your research project*. Third edition. London: Sage.

Orthmann, C.H. & Hess, K.M. & 2013. *Criminal investigation*. Tenth edition. Mason, OH: Cengage Learning.

Otter-Henderson, K.D. & Honts, C.R. 2001. Spontaneous countermeasures during polygraph examinations: An apparent exercise in futility. *Modern Psychological Studies*, 8(1):11-15.

Palmiotto, M.J. 2012. *Criminal investigation*. Fourth edition. New York: CRC Press.

Pardede, P. 2018. *Identifying and formulating the research problem: Research in ELT (Module 1)*. Available at: <https://www.researchgate.net/publication/329179630> (accessed on: 24 July 2019).

Patel, N., Gautman, V.K. & Jangir, J.J. 2013. The role of DNA in criminal investigation – admissibility in the Indian legal system and future perspectives. *International Journal of Humanities and Social Science Invention*, 2(7):15-21.

Patrick, C.J. & Iacono, W.G. 1991. A comparison of field and laboratory polygraphs in the detection of deception. *Psychophysiology*, 28(6):632-638.

Patton, M.Q. 2014. *Qualitative research and evaluation methods*. Fourth edition. Thousand Oaks, CA: Sage.

Pollina, D.A., Dollins, A.B., Senter, S.M., Krapohl, D.J. & Ryan, A.H. 2004. Comparison of polygraph data obtained from individuals involved in mock crimes and actual criminal investigations. *Journal of Applied Psychology*, 89:1099-1105.

Powell, R.R. & Connaway, L.S. 2004. *Basic research methods for librarians*. Fourth edition. Westport, CT: Libraries Unlimited.

Pretorius, C.F. 1996. The truth about lie detection in SA and what your lawyer did not tell you (about the polygraph as a forensic technique). *Servamus*, April:3-11.

Prinsloo, R. 2007. Exploring the use of the polygraph test in the workplace and as evidence in labour disputes. Unpublished LLM, University of Cape Town, Cape Town.

Punch, K. 1998. *Introduction to social research: Quantitative and qualitative approaches*. London: Sage.

Quality Polygraph Services, Inc./American International Institute of Polygraph. 2012. *Basic Polygraph Course Training Manual*. Stockbridge, GA: Quality Polygraph Services.

Quinlan, C., Babin, B., Carr, J., Griffin, M. & Zikmund, W. 2019. *Business research methods*. London: Cengage Learning.

Rahi, S. 2017. Research design and methods: A systematic review of research paradigms, sampling issues and instruments. *International Journal of Economic Development & Management Sciences*, 6(2):1-5.

Ranjit, K. 2011. *Research methodology: A step-by-step guide for beginners*. Third edition. Los Angeles, CA: Sage.

Raskin, D. 2015. Science and the polygraph profession. *APA Magazine*, 48(2):25-28.

Regenesys Business School. 2014. *Master of Business Administration research methodology*. Sandton: Regenesys Management.

Rheeder, J.R. 2012. *Polygraph testing and labour law*. Cibolo, TX: Veridicus International Polygraph Academy. (Training manual used by SAPS).

Robinson-Riegler, B. & Robinson-Riegler, G. 2012. *Cognitive psychology: Applying the science of the mind*. Third edition. London: Pearson.

Roman, D.J., Osinki, M. & Erdmann, R.H. 2017. *The construction of grounded theory in administration*. Available at: www.sciencedirect.com (accessed on: 20 December 2019).

Roulston, K. 2010. *Reflective interviewing: A guide to theory and practice*. London: Sage.

Russell, M. & Coetzee, C. 2000. *Truth extraction: How to read between the lines*. Claremont: Spearhead Press.

Saldana, J. 2011. *Fundamentals of qualitative research*. New York: Oxford University Press.

SAPS see South African Police Service.

Saunders, M., Lewis, P. & Thornhill, A. 2013. *Research methods for business students*. Sixth edition. Cape Town: Pearson Education.

Saunders, M., Lewis, P. & Thornhill, A. 2016. *Research methods for business students*. Seventh edition. New York: Pearson.

Scheithauer, A. & Kalula, E. 2008. Employee polygraph testing in the South African workplace. *South African Journal of Labour Relations*, 32(2):104-120.

Schuetzler, R.M. 2012. Countermeasures and eye tracking deception detection. *Information systems and quantitative analysis: Faculty proceedings and presentations*, 28. Available at: <https://digitalcommons.unomaha.edu/isqafacproc/28> (accessed on: 27 December 2018).

Schurink, W., Fouché, C.B. & De Vos, A.S. 2011. Qualitative data analysis and interpretation. In A.S. de Vos, H. Strydom, C.B. Fouché & C.S.L. Delport (eds). *Research at grassroots: For the social sciences and human service professions*. Fourth edition. Pretoria: Van Schaik.

Schwartz, A. 2005. A systematic challenge to the reliability and admissibility of firearms and toolmark identification. *Columbia Science and Technology Law Review*, 1:1-42.

Sekharan, P.C. 2013. Truth and truth detecting techniques. *Journal of Forensic Research*, Special Issue 11:1-11. Available at: <http://dx.doi.org/10.4172/2157-7145.S11-002> (accessed on: 3 December 2017).

Sennewald, C. & Tsukayama, J. 2006. *The process of investigation: Concepts and strategies for investigators in the private practice*. Oxford: Butterworth-Heinemann.

Sewsunker, S. 2014. Deceptive or effective? Polygraph testing in the workplace. *Without prejudice*, 14(3):102-103.

Slupski, C. 2013. Reducing – resolving inconclusive results and extended testing: Presentation by the South African Professional Polygraph Association, held in Pretoria at the CSIR.

Slupski, C. 2015. Validated techniques: Presentation by the South African Professional Polygraph Association, held in Pretoria at the CSIR.

Smit, B. 2002. Atlas.ti. for qualitative data analysis. *Perspectives in education*, 20(3):65-75.

Sosnowski, D. 2008a. Investigators' use of polygraph. *Free PATCE Newsletter*. Available at: <http://www.patc.com/weeklyarticles/polygraph-investigation.shtml> (accessed on: 21 October 2016).

Sosnowski, D. 2008b. Tech talk – Inconclusive polygraph results – Why? *APA Magazine*, 41(1):47.

South Africa. 1996. The Constitution of the Republic of South Africa, Act 108 of 1996. Pretoria: Government Printer.

South African Police Service. 1997. *Establishment of a polygraph unit in the SAPS*. [Correspondence]. [SAPS internal document].

South African Police Service. 1998. *Polygraph units in the SAPS*. [Correspondence]. [SAPS internal document].

South African Police Service. 2009. South African Police Service learners guide on crime scene management. Pretoria: Training Division.

South African Police Service. 2006. *National Instruction 1 of 2006 Research in the Service*. Available at: www.saps.gov.za (Retrieved: 10 January 2014).

South African Police Service. 2017a. *National Instruction 12 of 2017 Detective Service*. Available at: www.saps.gov.za (Retrieved: 3 January 2018).

South African Police Service. 2017b. SAPS Code of Conduct. In *Annual Performance Plan 2016/2017*. Pretoria: Commissioner of Police.

South African Police Service. 2018. *Annual performance plan 2017/2018*. Pretoria: Commissioner of Police.

Southern African Legal Information Institute (SAFLII). Available at: www.saflii.org (accessed on: 11 June 2014).

Sternberg, R.J. & Sternberg, K. 2012. *Cognitive psychology*. Sixth edition. Belmont, CA: Wadsworth, Cengage Learning.

Strauss, A.L. & Corbin, J.M. 1990. *Basics of qualitative research: grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications.

Strauss, A.L. & Corbin, J.M. 1994a. Grounded theory methodology: An overview (Pp. 273-285). In N.K. Denzin & Y.S. Lincoln (eds). *Handbook of qualitative research*. Thousand Oaks, CA: Sage.

Strauss, A.L. & Corbin, J.M. 1994b. *Handbook of qualitative research*. Los Angeles, CA: Sage.

Strauss, A.L. & Corbin J.M. 1998. *Basics of qualitative research: techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage.

Sullivan, C., Gibson, S. & Riley, S. 2012. *Doing your qualitative psychology project*. Los Angeles, CA: Sage.

Synnott, J., Dietzel, D. & Ioannou, M. 2015. A review of polygraph: History, methodology and current status. *Crime Psychology Review*, 1(1):59-83.

Tarase, G.M., Haveripeth, P.D. & Ramadurg, M.S. 2013. Scientific and legal procedure of polygraph test. *Journal of Bio Innovation*, 2(1):5-16. Available at: https://www.jbino.com.docs/Issue01_10_02_2013.pdf (accessed on: 10 January 2019).

Taylor, S.J., Bogdan, R., & DeVault, M.L. 2016. *Introduction to qualitative research methods. A guidebook and resource*. New Jersey: John Wiley and Sons.

Theofanidis, D. & Fountouki, A. 2018. Limitations and delimitations in the research process. *Perioperative Nursing*, 7(3): 155-163.

Thomas, G. 2013. *How to do your research project: A guide for students in education and applied social sciences*. Second edition. Los Angeles, CA: Sage.

Thornberg, R. & Charmaz, K. 2014. Grounded theory and theoretical coding. In U. Flick (ed). *The Sage handbook of qualitative data analysis*. London: Sage.

Timonen, V., Foley, F. & Conlon, C. 2018. Challenges when using grounded theory: A pragmatic approach to doing GT research. *International Journal of Qualitative Methods*, 17:1-10.

Tracy, S.J. 2013. *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact*. West Sussex: Blackwell Publishing.

Tredoux, C. & Pooley, S. 2001. Polygraph testing of deception: An evaluation and commentary. *Industrial Law Journal*, 22:819-839.

Trochim, W.M.K. & Donnelly, J.P. 2001. *The research methods knowledge base*. Second edition. Cincinnati, OH: Atomic Dog.

Tuckman, B.W. 1994. *Conducting educational research*. Fourth edition. San Diego, CA: Harcourt Brace College Publishers.

United States Department of Justice. Office of the Inspector General. Evaluation and Inspections Division. 2006. *Use of polygraph examinations in the Department of Justice*. Available at: <http://oig.justice.gov/reports/plus/e0608/final.pdf> (accessed on: 21 October 2016).

Urquhart, C. 2013. *Grounded theory for qualitative research: A practical guide*. Los Angeles, CA: Sage.

Van Aperen, S. 2016. The polygraph as an investigative tool in criminal and private investigations. *Investigative news and articles*. Available at: <http://www.diogenesllc.com/polyatool.html> (accessed on: 21 October 2016).

Van Damme, G. 2001. Forensic criminology and psychophysiology: Truth verification tools, with a special study of the Truster Pro. *Crime Research in South Africa*, 2(1):1-22.

Van Rooyen, H.J.N. 2008. *The practitioner's guide to forensic investigation in South Africa*. Pretoria: Henmar.

Vaughan, G.L. 2015. *Confessions: The law and polygraph*. Paper presented at the 50th Annual Seminar/Workshop of the American Polygraph Association, held in Chicago on 30 August to 5 September 2015.

Venter, A., Louw, D.A. Verschoor, T. 2003. Perceptions and memory: Implications for eyewitness testimony. *South African Journal of Criminal Justice*, 6:137-162.

Vicianova, M. 2015. Historical techniques of lie detection. *Europe's Journal of Psychology*, 11(3):522-534.

Vrij, A. 2007. *Detecting lies and deceit: Pitfalls and opportunities*. Second edition. Chichester: Wiley.

Wade, C. & Travis, C. 1990. *Psychology*. Second edition. New York: Harper Collins.

Watson, G.A. 2011. An examination of the operational application and utilisation of polygraph testing: A case study in the Limpopo province. Unpublished MTech Dissertation, University of South Africa, Pretoria.

Welman, C., Kruger, F. & Mitchell, B. 2005. *Research methodology*. Cape Town: Oxford University Press Southern Africa.

Wheeler, E. 2016. Applications of forensic evidence in criminal cases. *Themis: Research Journal of Justice Studies and Forensic Science*, 4(12):203-215. Available at: <http://scholarworks.sjsu.edu/themis/vol4/iss1/12> (accessed on: 28 December 2018).

White, B. 2017. Understanding polygraph accuracy goal tradeoffs. *APA Magazine*, 50(2): 69-78.

Willig, C. 2014. 2014. Interpretation and analysis. In U. Flick (ed). *The Sage handbook of qualitative data analysis*. London: Sage.

Wincap, E. 2017. *Criminological research: Understanding qualitative methods*. Second edition. Los Angeles, CA: Sage.

Woods, B. 2000. *Basics in psychology*. Second edition. London: Hodder & Stoughton.

Woods, P. 2015. Polygraph abroad – Great Britain. *APA Magazine*, 48(5):65-68.

Woodwell, D. 2014. *Research foundations*. Los Angeles, CA: Sage.

Wrench, J.S., Thomas-Maddox, C., Richmond, V.P. & McCroskey, J.C. 2016. *Qualitative research methods for communication: A hands-on approach*. Third edition. New York: Oxford University Press.

Yin, R.K. 2016. *Qualitative research from start to finish*. Second edition. London: The Guilford Press.

Yount, L. 2007. *Forensic science from fibers to fingerprints*. New York: Chelsea House.

CITED CASES

DHL Supply Chain (Pty) Ltd and others v National Bargaining Council for the Road Freight Industry & others (2014) 9 BLL R 860 (LAC)

Frye v United States 54 App.D.C. 46, 293 F 1013 (1923)

Joubert v Nedbank Ltd (1476/09) (2011) ZAECPEHC 28 (5 July 2011)

Lee v Martinez 96 P. 3d 291(2004)

M Shinga v Gilbeys Distillers and Vintners (Pty) Limited (Case no N11/2/10237, 1999)

Mathobela and another v S (A 172/2011) (2012) ZAGPJHC 80 (26 April 2012)

MEWUSA obo Mbonambi and S Bruce cc ta Multi Signs (2005) 14 MEIBC

Moliedi and another v Minister of Safety and Security and others 14060/2010 (2012) ZAGPPHC9 (13 January 2012)

NUMSA obo Mkhonza & others v Assmang Chrome Machadodorp Works (2005) 14 MEIBC 2.11.1, MEGA NHN 11/10237, 5978

PETUSA obo Van Schalkwyk v National Trading Co. (2000) 21 ILJ 2323 (CCMA)

S v SMM 2013 (2) SACR 292 SCA

SACCAWU obo Chauke v Mass Discounters (2004) 13 CCMA 21.3.1

Simani and Coca-Cola Fortune (2006) 15 CCMA 8.8.7

Steen v Wetherleys (Pty) Ltd (2006) BLLR 222

United States v Porter 776 F.2d 370 (1985)

United States v Posado 57F 3d 428

ANNEXURES A-F

Annexure: A

Permission from the SAPS (Detective Service) to conduct research

	
SOUTH AFRICAN POLICE SERVICE	SUID-AFRIKAANSE POLISE DIENS
<hr/>	
Privaatsak Private Bag X 302 PRETORIA 0001	Faks Nr : Fax No : 012 393 2193
Reference: 3/34/2	THE DIVISIONAL COMMISSIONER DETECTIVE SERVICE HEAD OFFICE PRETORIA 0001
Enquiries: Maj Gen Ramatsoele	
 012 393 4347	
 The Head Strategic Management Head Office PRETORIA 0001	
 RE: RESEARCH REQUEST: INVESTIGATORS PERCEPTIONS OF POLYGRAPH IN THE SOUTH AFRICAN CONTEXT: MASTERS DEGREE: UNISA : RESEARCHER: M GUMALA YOUR 3/34/2 COL J SCHNETLER DATED 28 NOVEMBER 2014	

1. I refer to the above mentioned matter. This office went through the proposal and finds the proposal to be good. The proposal is thus supported. From the type of topic, the investigation of crime will not be prejudiced as the interview is focussing on the investigators and not the victims in the pending cases.
2. This office approves the request.

Kind regards,


P.P. RAMATSOELE
MAJOR GENERAL
A/DIVISIONAL COMMISSIONER: DETECTIVE SERVICE
DATE: 2 DECEMBER 2014

Annexure: B

Permission from the SAPS (Forensic Service) to conduct research



Private Bag X322 Fax No:

012 421-0401

Your reference: 3/34/2

THE DIVISIONAL COMMISSIONER

My reference:

FORENSIC SERVICES

Enquiries: Major NM Rababalela

PRETORIA

Tel: (012) 421-0204

0001

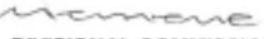
The Head

STRATEGIC MANAGEMENT

RE: RESEARCH REQUEST: PERCEPTIONS AND EXPERIENCES OF INVESTIGATORS IN SAPS REGARDING THE APPLICATION OF POLYGRAPH IN CRIMINAL INVESTIGATIONS: MASTER DEGREE, UNIVERSITY OF SOUTH AFRICA: RESEARCHER: M GUMALA

1. Your communiqué with reference 3/34/2 dated 13 June 2014 bears reference.
2. Approval is hereby granted to the above-mentioned request, provided that the applicable directives on conducting research are adhered to.

Kind Regards

 **LIEUTENANT GENERAL
DIVISIONAL COMMISSIONER: FORENSIC SERVICES
JK PHAHLANE**

DATE: 2014-12-12

Annexure: C

Ethical clearance certificate from the Ethical Committee at the University of South Africa

COLLEGE OF LAW RESEARCH ETHICS REVIEW COMMITTEE

Date: 2015-04-01

Reference: ST 33

Applicant: M Gumala

Dear M Gumala

DECISION: ETHICS APPROVAL

Name	M Gumala
Proposal	Perceptions and experiences of investigators in the SAPS regarding the application of polygraph in criminal investigations
Qualification	MA Criminology

Thank you for the application for research ethics clearance by the College of Law Research Ethics Review Committee for the above mentioned research. **Final approval is granted.**

The application was reviewed in compliance with the Unisa Policy on Research Ethics.

The proposed research may now commence with the proviso that:

1. *The researcher will ensure that the research project adheres to the values and principles expressed in the Unisa Policy on Research Ethics which can be found at the following website:*

http://www.unisa.ac.za/cmsys/staff/contents/departments/res_policies/docs/Policy_Research%20Ethics_rev%20app%20Council_22.06.2012.pdf

2. *Any adverse circumstances arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the College of Law Ethical Review Committee.*



University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392, Unisa, 0003, South Africa
UNISA/UNISA 2015/04/01

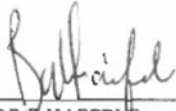
An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants

3. *The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

Note:

The reference number (top right corner of this communique) should be clearly indicated on all forms of communication (e.g. Webmail, E-mail messages, letters) with the intended research participants, as well as with the URERC.

Kind regards



DR B HAEFELE
CHAIR PERSON: RESEARCH ETHICS
REVIEW COMMITTEE
COLLEGE OF LAW



PROF R SONGCA
EXECUTIVE DEAN:
COLLEGE OF LAW

Annexure: D

Participants consent to participate in the research

Dear Investigating Officer

I am a Master of Arts, Criminology student at the University of South Africa. The main focus of my study is encapsulated in my research topic: **Perceptions and experiences of investigators' in the SAPS regarding the application of polygraph in criminal investigations.**

The SAPS, Division: Forensic Services and Division: Detective Services have granted permission for this research which involves 20 investigators to be interviewed for approximately 30 minutes. I would like you to participate in this research. This study will afford you the opportunity to discuss your perceptions and experiences of polygraph as an investigative aid to shed insight on its impact and whether or not it is a viable and beneficial diagnostic aid in criminal investigations.

Your participation is voluntary and you may withdraw at any point during the interview. There will be no monetary reward for your participation and no risks are involved. Your name will not be identified in the research report. The findings of the research will be published in the dissertation for which this study is being conducted and may be published in an academic journal or presented at a scientific meeting.

This research is conducted under the supervision of Prof. Herbig at UNISA (Department of Criminology and Security: Science School of Criminal Justice). Prof. FJW Herbig can be contacted on herbifjw@unisa.ac.za. Please feel free to contact me if you have any queries regarding the research or any other related matter.

Thank you

Manjula Gumala

Signature: _____

Date: _____

E-mail: manjulag@vodamail.co.za

Cell: 071 686 9057

INVESTIGATOR'S CONSENT TO PARTICIPATE IN THE STUDY

I, _____ herewith confirm that I understand the above conditions of the research study which have been explained to me and that I agree to participate in the abovementioned study.

SIGNATURE: _____ DATE: _____

Annexure: E

Interview Schedule

Perceptions and experiences of Investigators in the SAPS regarding the application of polygraph in criminal investigations

General information

Rank	
Gender	
Length of service	

Questions

Investigators who have used polygraph

1. Outline your experience as an IO in the SAPS. (What cases do you investigate? What are some of the resources from within the forensic science environment you use to solve cases?)
2. What has your experience using polygraph been?
3. How often do you use polygraph in your investigations?
4. Describe the types of cases you have used polygraph?
5. Has polygraph assisted you in any investigation/s? Explain further how it has helped. Cite examples.
6. Based on your experience, do you feel that polygraph is a useful and viable aid in criminal investigations?
7. Do you have concerns regarding polygraph utilisation?

Investigators who have never used polygraph

8. Outline your experience as an IO in the SAPS. (What cases do you investigate? What are some of the resources from within the forensic science environment you use to solve cases?)
9. Have you heard about polygraph? Are you aware that the SAPS has a polygraph capacity that assists investigators in criminal cases? If yes. Why have you never used polygraph in any investigation?
10. If you had a better understanding of polygraph, would you use it an investigative aid? If no, why not?
11. What are your concerns about using polygraph as an investigative aid in a criminal investigation?

Annexure: F

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